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FURTHER ADDITIONS TO THE BRITISH APHID FAUNA.

By H. L. G. Stroyan.

(*Plant Pathological Laboratory, Harpenden, Herts.*)

Manuscript received 6th March, 1957.

(Read 1st May, 1957).

With 3 Plates and 6 Text-figures.

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I. Introduction.

Since the two parts of *Recent Additions to the British Aphid Fauna* (Stroyan, 1950, 1955) were submitted for publication a number of additions have been made to the British aphid fauna. This paper is designed to bring the documentation of the British list up to the end of 1956.

It is hoped to follow this and the two preceding instalments of additions by the preparation of a new check-list of British aphid species to replace the valuable but now outdated one of Kloet and Hincks.

II. List of Species Discussed.

1. *Dactynotus* (*Uromelan*) *helenae* Hille Ris Lambers, 1950.
2. **Acyrthosiphon shawi** sp. n.
3. *Rhodobium porosum* (Sanderson, 1901).
4. *Anthracosiphon hertae* Hille Ris Lambers, 1947.
5. **Nasonovia (Neokakimia) dasyphylli** sp. n.
6. *Hyperomyzus* (*Neonasonovia*) *hieracii* (Börner, 1939).
7. *Ericaphis latifrons* (Börner, 1942).
8. *Myzus* (*Nectarosiphon*) *ajugae* Schouteden, 1903.
9. **Brachycaudus jacobi** sp. n.
10. *Schizaphis agrostis* Hille Ris Lambers, 1947.
11. *S. holci* Hille Ris Lambers, 1947.
12. *S. laingi* Eastop, 1956.
13. *Aspidaphium escherichi* Börner, 1939.

14. *Decorosiphon corynothrix* Börner, 1939.
15. *Lipaphis matthiolae* Doncaster, 1954.
16. *L. cochleariae* Jacob, 1956.
17. *L. turritella* (Wahlgren, 1938).
18. *Hydaphias hofmanni* Börner, 1950.
19. *Aphis comosa* (Börner, 1950).
20. *A. helianthemi* Ferrari, 1872.
21. *A. longirostris* (Börner, 1950).
22. *A. mirifica* (Börner, 1950).
23. *A. origani* Passerini, 1860.
24. *A. passeriniana* (del Guercio, 1900).
25. *A. pilosellae* (Börner, 1952).
26. *A. serpylli* Koch, 1854.
27. *A. verbasci* Schrank, 1801.
28. *Thripsaphis verrucosa* Gillette, 1917.
29. *Chaitophorus albus* Mordvilko, 1901.
30. *C. niger* Mordvilko, 1929.
31. *C. truncatus* (Hausmann, 1802).
32. *Kallistaphis betulicola* (Kaltenbach, 1843).
32a. **K. basalis,** nom. nov.
33. *Myzocallis schreiberi* Hille Ris Lambers and Stroyan, *nom. nud.*
34. **M. börneri,** nom. nov.
35. *Therioaphis luteola* (Börner, 1949).
36. *Ctenocallis setosus* (Kaltenbach, 1846).
37. *Cinara schimitscheki* Börner, 1940.
38. *C.* (*Laricaria*) *kochiana* Börner, 1939.
39. *C.* (*Cinaropsis*) *bogdanowi* (Mordvilko, 1894).
40. *Aloephagus myersi* Essig, 1950.
41. *Pemphigus* (*Pemphiginus*) *populi* Courchet, 1879.

III. Descriptions of and Notes on the Species.

1. *Dactynotus* (*Uromelan*) *helenae* Hille Ris Lambers, 1950.

(Plate II, A).

First described from Swiss material taken by Stäger in 1947 on *Carlina vulgaris* at Zeneggen (Hille Ris Lambers, 1950). The aphids live in large but somewhat diffuse colonies up the stems of the host, in among the prickles and tomentum, which makes their removal from the plant a matter of some difficulty.

Colour in life jet black with a bronze tinge, shining.

Morphology in general typical for genus. *Apterae* with 25–52 secondary rhinaria on third antennal joint, *alatae* so far as known with 68–83. Dorsal sclerotic pattern consisting of small spinal scleroites which are not fused into plaques bearing more than one hair except on the eighth and occasionally the seventh tergites, where fusion into more or less complete transverse bars occurs. *Postsiphuncular* sclerites large and conspicuous, *antesiphunculars* absent. *Alata* with distinct marginal sclerites bearing 2–4 hairs each on the second to fourth abdominal segments. *Siphunculi* in *apterae* very thick and heavy in appearance, their width at half length a little less to a little greater than that of the cauda at its half length. *Cauda* about half length of siphunculi or a little less, with 7–12 hairs :

usually somewhat constricted at about one-third of its length, and not very heavily pigmented, brownish rather than black. *Rostrum* reaching just beyond third coxae, apical joint long and slender, *c.* 0·19 mm., with 4–8 secondary hairs. Macerated specimens with *antennae* and *siphunculi* entirely black, *tibiae* black only at apices, *femora* black over distal half, remainder of femora and tibiae pale yellowish.

Measurements of specimens :

Body.	Ant. flag.	Joint ratios, (III–VI.)	Siph.	Cau.	Sec. rhin. III.	Form.
2·53	2·41	106 : 50 : 49 : 14+82	0·66	0·26	68 & 71	Alata.
2·24	2·18	92 : 51 : 43 : 14+73	0·64	0·29	46 & 48	Aptera.
2·39	2·08	91 : 43 : 44 : 14+68	0·61	0·30	48 & 49	,,
2·09	2·10	91 : 46 : 41 : 15+69	0·61	0·28	38 & 38	,,

All length measurements in mm. ; antennal flagellum excludes joints I and II.

British material of *D. helenae* has been recorded as follows : (1) GLAMORGAN : abundant on *Carlina vulgaris* growing in dry slacks between sand-dunes at Kenfig Burrows, 1.viii.54 (*J. H. Fidler* and *H. L. G. S.*) ; (2) CAERNARVON : on *Carlina vulgaris* growing in shingle just above high-water mark, at base of boulder clay cliff, Penrhyn Bay, 9.viii.54 (*F. H. Jacob*).

2. **Acyrthosiphon shawi** sp. n. (Plate IIIA ; fig. 1, A–E).

Apterous viviparous female : Macerated specimens. *Body* about 2·25–2·75 mm. long. Whole aphid entirely pale except for slight dusky shadowing at apex of ant. V, on ant. VI especially around the primary rhinarium, and on tarsi. *Frons* shallowly emarginate, with a slight median convexity. *Frontal width* 0·21–0·24 mm. *Antennae* 6-jointed, flagellum from a little less to a little more than half body length ; processus terminalis from a little less than 2¼ to about 2⅓ times as long as basal part of ant. VI, and equal to or a little longer than ant. IV ; ant. III with 1–3 rather conspicuous secondary rhinaria near the base. *Antennal hairs* slightly knobbed to acute, maximally 11–16 μ long on ant. III, or from nearly three-eighths to one half the articular diameter of the joint. *Rostrum* reaching nearly to hind coxae, apical joint rather acute, subequal to second joint of hind tarsi, with 5–9 secondary hairs. *Cephalic hairs* blunt, up to about twice as long as antennal hairs. *Siphunculi* pale, rather short and thick, subcylindrical to just before apex, then usually with a subapical incised circumcision showing one or two transverse striations ; flange well developed. *Cauda* slightly to distinctly shorter than siphunculi (in one specimen one siphunculus is fractionally shorter than the cauda), rather thick, bluntly digitiform to slightly tapering, often slightly constricted at about one-third of its length, with 8–13 hairs of which 1–2 are usually placed dorsally near the apex and so rather hard to see. *Spinal abdominal hairs* up to about 16 μ long, or similar to antennal hairs. *Eighth tergite* with 5–13 blunt hairs of maximal length 20–36 μ. *Spinal tubercles* absent, *marginal tubercles* present from abd. 2–5 inclusive in at least some specimens, flat, pale and very hard to see in adults. *Hairs of hind tibiae* maximally about 50 μ long, maximal width of tibia about 65 μ. *Dorsal body cuticle* usually somewhat irregularly wrinkled, pale, slightly sclerotic segmentally but with the sclerotic tergites not fused across the segmental boundaries. *First tarsal joints* with 3, 3, 3 hairs.

Type material (holotype aptera and five paratypes) from inflorescences of *Cakile maritima* Scop., St. Coombs, Fraserburgh, ABERDEEN (NORTH), 22.viii.55 (leg. *M. W. Shaw*).

Measurements of specimens :

Body.	Ant. flag.	Joint ratios (III–VI).	Siph.	Cau.	Cdl. hrs.	A.j.r.	2.h.t.	Sec. rhin. on ant. III.
2·64	1·47	25 : 17½ : 14 : 8+18	0·38	0·31	12	0·16	0·16	2 & 3
2·27	1·42	23 : 16½ : 14 : 7½+18½	0·38	0·29	10	0·17	0·16	2 & 2
2·50	1·28	20½ : 15 : 13½ : 7+15½	0·33	0·30	12	0·15	0·15	2 & 2
2·32	1·30	20 : 14½ : 13 : 7½+17½	0·32	0·30	10	0·16	0·16	2 & 2
2·22	1·38	22 : 16 : 14½ : 7½+17	0·36	0·30	13	0·16	0·16	1 & 2
2·67	1·50	25 : 18 : 15 : 8+18	0·38	0·32	12	0·16	0·17	2 & 2
2·46	1·28	21 : 15 : 13½ : 7+15	0·33	0·29	10	0·15	0·16	2 & 1
2·50	1·38	22½ : 16½ : 14 : 7+17	0·33	0·29	10	0·15	0·17	2 & 3
2·61	1·33	21½ : 16 : 12½ : 7½+17	0·34	0·32	10	0·15	0·16	1 & 2
2·46	1·19	20 : 14 : 12½ : 6+14	0·30	0·27	9	0·14	0·16	1 & –

Nos. 1–6, type series ; 7, *Cakile*, South Uist, 21.viii.56 ; 8–10, *Honkenya peploides*, South Uist, 21.viii.56 (7–10, leg. *R. M. Allan*). All length measurements in millimetres.

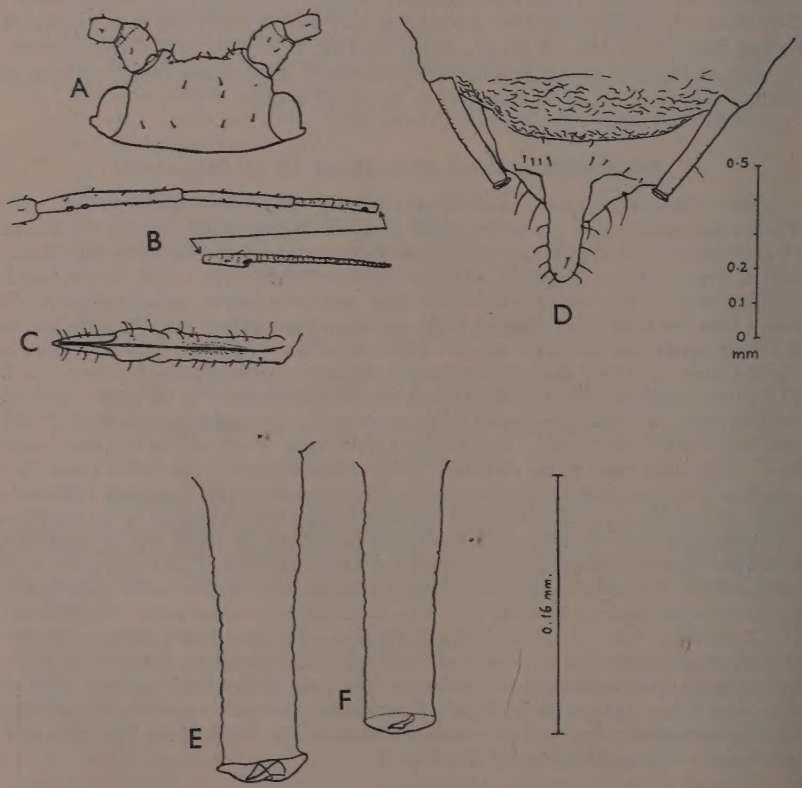

Fig. 1.—*Acyrthosiphon shawi* sp. n. : apt. viv. ♀, A head, B antennal flagellum, C rostrum, D posterior abdominal segments with siphunculi and cauda ; 3rd instar, E siphunculus. *Acyrthosiphon silenicola* H. R. L. : 3rd instar, F siphunculus.

Biology.—The cycle of *A. shawi* is not yet established with certainty. The original find was on *Cakile maritima* ; but this is not suitable to be the host of a monoecious aphid, as all known species of *Acyrthosiphon* are, since it is a drift-line annual whose seeds are transported by waves (Clapham, Tutin and Warburg, 1952), and successful overwintering by the aphids is therefore not possible. However, Mr. R. M. Allan of the North of Scotland College of Agriculture, Aberdeen, while collecting in South Uist, found a number of *A. shawi* both on *Cakile* and on *Honkenya peploides* (L.) Ehrh. The latter, which is commonly associated with *Cakile* in the tide-line vegetation, is a perennial species whose habit would be more suitable for overwintering by aphids. Since the nearest relative of *A. shawi* appears to be *A. silenicola* H. R. L., living on *Silene maritima*, which is also a member of the Caryophyllaceae, it seems at least a reasonable possibility that *Honkenya* is the true host of *shawi*.

Taxonomy.—*Acyrthosiphon shawi* sp. n. is clearly distinct from the hitherto known British species of the genus by its very short antennae and short,

A. shawi sp. n.	*A. silenicola* H. R. L.
Adult aptera :	*Adult aptera :*
Abdominal tergites usually with distinctly wrinkled cuticle.	Abdominal tergites with quite smooth featureless cuticle.
Apical rostral segment 0·14–0·17 mm. long. (Rarely 0·14).	Apical rostral segment 0·13–0·14 mm. long.
Siphunculi longer than cauda (exceptionally fractionally shorter), thinnest subapically and with a very distinct flange.	Siphunculi slightly shorter than cauda, thinnest near the middle and with a very small flange.
Antennae with pigmentation, if present, localised around primary rhinaria. Hairs on joint III maximally three-eighths to one-half diameter of joint articulation.	Antennae uniformly palish sclerotic throughout, not darker round primary rhinaria. Hairs on joint III maximally four-sevenths to two-thirds diameter of joint articulation.
Abdomen with marginal tubercles present in at least some specimens.	Abdomen without marginal tubercles.
Larva (3rd instar) :	*Larva (3rd instar) :*
Siphunculi with opercular area sharply separated from rest of surface by a distinct flange. Porus of average size (fig. 1, E).	Siphunculi with opercular area not demarcated by a flange, only by absence of sclerotisation. Porus rather small (fig. 1, F).
Abdominal spiracles with anterior margin thickened, lying behind a small but distinct pigmented spiracular plate.	Abdominal spiracles with anterior margin hardly thickened, spiracular plate undifferentiated and only detectable if seen in profile.
Abdomen with marginal tubercles present.	Abdomen without marginal tubercles.
Antennae with local pigmentation at joint apices and around rhinaria.	Antennae uniformly pigmented or gradually darker from base to apex.
Hairs on eighth tergite up to 20 μ long, blunt and a little swollen apically.	Hairs on eighth tergite up to 28 μ long, blunt but not apically swollen.
Siphunculi and tarsi distinctly darker than tibiae.	Siphunculi pale, tarsi concolorous with tibiae.

apically constricted siphunculi. It agrees rather closely in a number of characters with *Acyrthosiphon silenicola* Hille Ris Lambers, described from Iceland and living on *Silene maritima*. On close examination, however, agreement between the two is found to be less detailed than appears from first inspection. The tabulated list of differences (p. 315) is based on comparison of the available material of *shawi* with cotypes of *silenicola* kindly lent by Dr. Hille Ris Lambers.

The placing of *A. shawi* in *Acyrthosiphon* is at present rather tentative, and is based on the absence of any differences from known species of the genus large enough to justify the erection of a new genus or subgenus, rather than on any close relationship to other *Acyrthosiphon* species apart from *silenicola*. Hille Ris Lambers (1955) suggests that *A. ilka* Mordvilko may be related to *silenicola* ; this clearly assumes that *ilka* is not the same as *Liporrhinus chelidonii* (Kltb.), with which Börner equates it, and which is not near *silenicola*. The host associations of *A. shawi* may provide a link between *ilka* and *silenicola*, since *Cakile* is a Crucifer, and the Cruciferae are closely related botanically to Papaveraceae (*A. ilka* lives on *Papaver*) ; while *Honkenya peploides* provides the Caryophyllaceous link with *A. silenicola*.

Distribution and material studied.—The known distribution of *Acyrthosiphon shawi* is ABERDEEN (NORTH) and HEBRIDES. The material studied in the preparation of this account consisted of 28 apterous viviparous females (six of which constituted the type series), 41 larvae of all instars and three nymphs. The holotype will be deposited in the British Museum (Natural History) ; paratypes and non-type material remain in the collections of Mr. M. W. Shaw, Dr. Hille Ris Lambers of Bennekom, Netherlands, and the author.

The species is named in honour of its original finder, Mr. M. W. Shaw of the North of Scotland Agricultural College, Aberdeen, to whom I am indebted for much help in the study of the Scottish aphid fauna.

3. *Rhodobium porosum* (Sanderson, 1901).

Hille Ris Lambers (1947*b*) described the new genus *Rhodobium* with type species *Macrosiphum rosaefolium* Theobald, 1915. The type species is apparently a synonym of *Myzus porosus* Sanderson, 1901. It has occurred in the Netherlands on roses under glass. Eastop (1956*b*) places on record material taken on roses in a glasshouse at Cheshunt, HERTFORDSHIRE, by Mr. E. R. Speyer on 4.vii.40. This is the only British record at present. The natural range of the species is tropical and subtropical. For a full description *see* Hille Ris Lambers (1947*b*).

4. *Anthracosiphon hertae* Hille Ris Lambers, 1947.

The only hitherto known material of this genus and species is that originally described by Hille Ris Lambers from *Potentilla anserina* in the Netherlands. Eastop (1956*b*) has recently placed on record a single alata trapped at Aberdaron, CAERNARVON, on 17.vi.33 (*W. Maldwyn Davies* leg.). For a full description of the species reference may be made to Hille Ris Lambers (1947*b*).

5. **Nasonovia (Neokakimia)** (nov. comb.) **dasyphylli** sp. n.
(Plate I, A, B; fig. 2).

The subgenus *Neokakimia* Doncaster and Stroyan, 1952, was erected in the genus *Kakimia* Hottes and Frison to receive the species *saxifragae* Donc. and Str., from *Saxifraga nivalis* on Jan Mayen I. The placing of this subgenus was determined partly by the form of the stigmata, which are overhung by a cowl-like operculum as in *Kakimia*, and partly by the geographical situation of the type locality, which it was expected at the time would prove to have faunistic affinities with Greenland and North America rather than with Europe and the Palaearctic region. At the same time it was recognised that a close affinity also existed between *Kakimia* and *Nasonovia* Mordvilko, and that the other characters of *Neokakimia* suggested that it should hold an annectant position between the two former genera.

Börner (1952) regarded *Neokakimia* as synonymous with *Nasonovia*, and in this he was consistent, since it has subsequently been established that *Submacrosiphon brevipes* Börner, 1950, which he placed in *Nasonovia* in 1952, is also a *Neokakimia* (Hille Ris Lambers, *in litt.*). Two further forms have since been recognised in Europe belonging to *Neokakimia*, and this leads me to believe that it is better to use *Neokakimia* as a subgenus of *Nasonovia* Mordvilko than as a subgenus of the New World genus *Kakimia* H. and F. The main characters separating *Neokakimia* from *Nasonovia* s.s. are the stigmatal structure which resembles that of *Kakimia*, and the very short second tarsal joints, characters present in all the species of the subgenus yet found. Biologically the species appear to be either monoecious-holocyclic or anholocyclic on species of *Saxifraga* or *Sedum*.

The species here described as new was originally taken by Mr. C. H. Gimingham on *Sedum dasyphyllum* at Kidlington, Oxon., on 3.vii.45. The material was found among aphid samples sent to me by Mr. C. T. Gimingham for examination in 1953. From information supplied by him and his son I was able to refind the species in its original locality during 1954, and collect a large series including a good number of alatae.

Colour Notes.

Pale grass green to yellowish-green, sometimes tinged with reddish ochreous. Dorsum to a greater or less extent occupied in apterae by a large central black sclerotic area, extending in the majority of summer specimens from the metanotum to the fifth abdominal tergite. Separate bands are present across the pro- and mesonotum, and on the central part of the sixth and seventh abdominal tergites. Alatae with head and thorax black, abdomen with a central black area and black marginal sclerites. Head, legs and siphunculi in apterae brownish sclerotic, siphunculi paler in the middle than at base and apex. Immature forms without dark sclerotic pattern apart from small hair-bearing dorsal scleroites; colour as in adults or a little paler.

Morphology.

Apterous viviparous female: Body spindle-shaped, rather small in size. *Frons* W-shaped, median prominence much lower than lateral ones; without granular or spinulose sculpture. *Frontal hairs* with fairly stout shafts and spear-shaped apices, maximally a little longer than the articular diameter of the third antennal joint. *Antennae* 6-jointed, flagellum from a little longer to a little shorter than body; rather evenly pale brownish

sclerotic, or with apices of joints, and basal part of VI, a little darker. Joint III with 11–37 secondary rhinaria irregularly arranged over its length, joint IV with 0–12, joint V usually without secondary rhinaria but occasionally with 1 or 2. Joint III almost smooth, joints IV and V with a few scattered imbrications, joint VI regularly imbricate. *Antennal hairs* on all joints fairly stout, blunt to spear-shaped apically, those on III maximally about as long as articular diameter of joint. *Processus terminalis* in midsummer material from 1·38 to 1·68 times as long as joint III (mean of 36 specimens 1·50, standard deviation 0·08); in autumn specimens relatively shorter, 1·20–1·42 times III in 5 specimens examined. *Rostrum* reaching about to third coxae, normal in form, apical and penultimate joints markedly hairy, apical joint 1·7–2·25 times second joint of hind tarsi, and with 15–24 secondary hairs in addition to the 3 primary pairs at the apex. *Sclerotic pattern* of abdominal dorsum very variable. In the majority of specimens the pigmented area is as described under " Colour notes ", and extends laterally to fuse with the pleural margins of the marginal

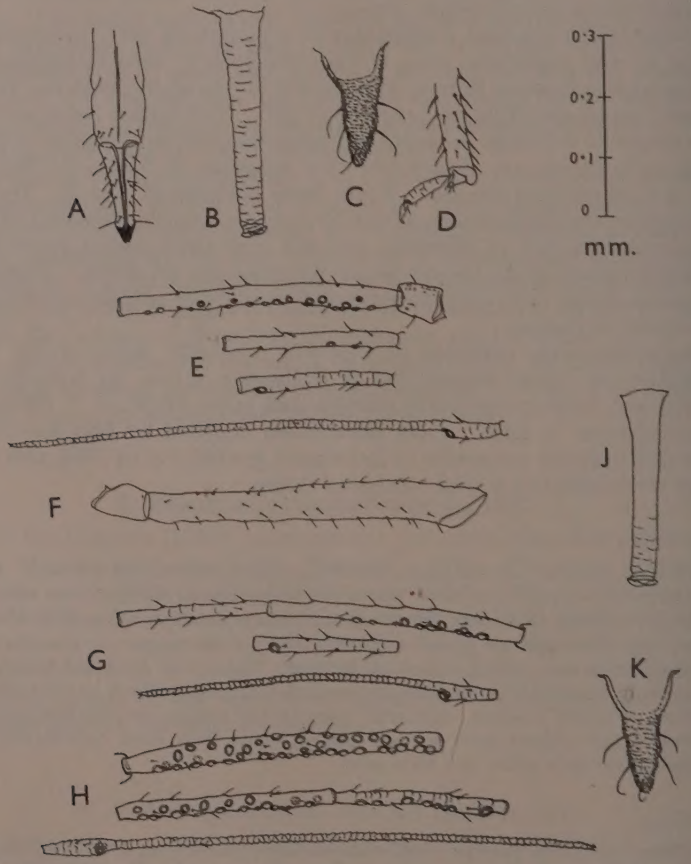

FIG. 2.—*Nasonovia (Neokakimia) dasyphylli* sp. n.: apt. viv. ♀, A rostrum, B siphunculus, C cauda, D hind tarsus and tibial apex, E antennal joints II–VI, F hind femur, G antennal joints III–VI (autumnal specimen); al. viv. ♀, H antennal joints III–VI, J siphunculus, K cauda.

sclerites on abd. 1–4 inclusive. There is a median longitudinal membranous stria interrupting the anterior half of the central black area. There is a small rounded antesiphuncular sclerite and a rather larger postsiphuncular which is a component of the marginal series. Sixth and seventh tergites with conspicuous transverse oval spinal patches or bands. The eighth tergite bears only a weakly sclerotised band which is usually more or less broken up into small pale individual hair scleroites. Frequently the whole pattern is much reduced, and may consist merely of a series of segmental bars or groups of individual hair scleroites on the central regions of the middle abdominal segments. Arrangement of *dorsal hairs* and structure of *spiracles* as in the type species *N. saxifragae* Donc. and Str. Small *marginal tubercles* present on pronotum and abd. 2–5 inclusive, sometimes absent from one or more segments, and sometimes duplicated; the individual tubercles from about as large to a little larger than the marginal hair bases. *Siphunculi* more or less cylindrical, slightly broader at base, pale brownish sclerotic, usually somewhat paler in the middle, rather indistinctly imbricate, with a small flange; normally from 3·8 to 5·3 times second joint of hind tarsi in length, but in small specimens down to as little as 3·2 times as long. *Cauda* rather variable, elongate finger-shaped to rather acute triangular, generally somewhat tapering apically; from about two-fifths to three-fifths length of siphunculi, but generally about half as long or a little less; with 5 hairs (two pairs and one subapical) on distal three-fifths in all specimens so far examined. *Legs* pale brownish sclerotic, apices of tibiae darkened and apices of femora slightly clouded; *femoral* and *proximal tibial hairs* short, blunt or thorn-like, those on femora up to about one-third of the width of the femora in the middle. *Second tarsal joints* very short, not much more than half width of frons. *First tarsal joints* of all legs with 3 hairs. *Subgenital plate* with 2–3 supernumerary hairs on anterior half in addition to the primary pair, and posterior marginal series of 9–11 hairs in a single row.

Measurements of specimens:

Body.	Ant.	Joint ratios (III–VI).	Siph.	Cau.	A.j.r.	2.h.t.	Sec. rhinaria. III.	IV.	V.
1·94	1·94	63 : 39 : 34 : 13+94	0·40	0·21	0·17	0·09	–/22	–/2	–/0
2·32	2·11	69 : 42 : 41 : 14+98	0·46	0·26	0·18	0·09	27/27	1/1	0/0
1·97	1·91	63 : 39 : 36 : 13+88	0·38	0·21	0·18	0·10	32/35	10/9	2/0
1·42	1·46	42 : 28 : 27 : 12+73	0·27	0·14	0·16	0·08	16/12	0/0	0/0
1·92	1·47	51 : 31 : 29 : 12+61	0·35	0·19	0·16	0·09	11/11	0/0	0/0

All specimens from *Sedum dasyphyllum*, Kidlington, Oxon. Nos. 1 (holotype) and 2 (paratype), 3.vii.45 (*C. H. Gimingham*); 3, 4 and 5 (topotypes), 22.vi.54, 26.vii.54 and 30.ix.54 respectively (*H. L. G. S.*). All length measurements in mm. Antennae measured without joints I and II.

Alate viviparous female: Morphologically similar to aptera in essential characters. *Antennae* longer than in aptera and uniformly dark sclerotic; *processus terminalis* 1·43–1·73 times as long as joint III, mean for midsummer specimens 1·56, standard deviation 0·06, mean for 2 autumn specimens 1·58. Joint III with 34–55 irregularly arranged secondary rhinaria over its whole length, IV with 13–24, V with 5–11. *Rostrum* as in apterae, apical joint with 15–20 secondary hairs in material examined. *Dorsal abdominal pattern* essentialiy as in aptera, but central black area reduced in size, so that the marginal sclerites and the spinal and pleural elements of the first and second tergites are present as separate sclerites: a pair of spinal segmental sclerites and large pleural and smaller spinal intersegmental sclerites on each tergite. The central patch is typically similar in shape to that of *Myzus persicae* (Sulzer), *i.e.* a trapezoidal area produced pleurally on the third and fourth tergites by fusion with the pleural intersegmental sclerites. *Postsiphuncular* sclerite larger than in aptera, and extending solidly across behind the spiracular plate of the sixth segment. Variation of the pattern is similar to that in the apterae, with progressive fenestration

and breaking up of the central patch until only paired spinal sclerites are left. *Siphunculi* rather shorter than in aptera, 1·62–1·94 times as long as apical joint of rostrum; mean for 14 midsummer specimens 1·86, standard deviation 0·06; mean for 2 autumn specimens 1·74. *Cauda* shorter and more tapering than in aptera, with 5 hairs. *Legs* darker and more slender than in aptera, distal two-thirds to three-quarters of femora strongly darkened.

Brachypterous forms are of rather frequent occurrence in the midsummer alate generation. These have abbreviated wings which are more or less malformed, a similar range of secondary rhinarial numbers (38–52 on III, 13–22 on IV, 5–9 on V) to the alatae, and a tendency to approach the apterous form in the size and density of the dorsal abdominal black area. The fore wings of 8 such brachypterae vary in length from 0·96 to 1·98 mm., against 2·27–3·18 mm. in 6 normal alatae of the same generation.

Measurements of specimens:

							Sec. rhinaria.		
Body.	Ant.	Joint ratios (III–VI).	Siph.	Cau.	A.j.r.	2.h.t.	III.	IV.	V.
2·15	2·21	68 : 44 : 39 : 14+111	0·34	0·20	0·18	0·10	52/50	24/18	8/9
2·06	2·10	65 : 40 : 38 : 15–104	0·35	0·21	0·18	0·09	50 52	23 22	11/7
1·86	2·10	66 : 43 : 36 : 15+102	0·34	0·21	0·18	0·10	48/47	21/23	7/6
2·00	2·06	67 : 39 : 36 : 14+102	0·32	0·19	0·18	0·09	41/47	15/19	10/7
1·87	1·78	58 : 35 : 33 : 13+ 83	0·30	0·18	0·16	0·09	38/38	16/13	8/7
2·07	2·02	67 : 36 : 35 : 14+101	0·37	0·21	0·18	0·08	38/41	17/13	7/7

All specimens from *Sedum dasyphyllum*, Kidlington, Oxon. Nos. 1 (morphotype) to 4, 22.vi.54; No. 5, 3.ix.54; No. 6, brachyptera, 22.vi.54 (*H. L. G. S.*). All length measurements in mm. Antennae measured without joints I and II.

Biology.—The only known population of this aphid has persisted in the type locality for nine and a half years, on a limited number of plants of the shade form of *Sedum dasyphyllum* growing on the eastern aspect of the churchyard wall, which is overhung by a row of large lime trees. No aphids have been found elsewhere in the village, either on *Sedum dasyphyllum* or other species such as *S. album* and *S. acre*, which are abundant on walls in the area. Heavily attacked plants show some reaction in wilting and drooping of the stems, which may also become rather twisted; the worst infested plants are prematurely killed. On the latest date when I was able to visit the locality in 1954, 21st September, a considerable number of apterous viviparae and one or two nymphs were still to be found on *Sedum*. A culture was maintained in the laboratory at Cambridge until the end of October, by which time the plants were dead and no sexual forms had appeared. It was thought possible that this was because of continued long hours of illumination by fluorescent lighting after dark. However, Mr. A. F. G. Dixon of Oxford has subsequently informed me that viviparae were still living on *Sedum* at Kidlington in the first week of December. It therefore seems probable that *N. dasyphylli* is anholocyclic on *Sedum*. Since the hosts of the other known forms of *Neokakimia* are species of *Saxifraga*, it may be that the present species has originated from a form living primarily on Saxifragaceae, but able to use Crassulaceae as reserve hosts. The two orders are closely related botanically and ecologically, and it is likely that such an association in *N. dasyphylli* is to be regarded as a form of polyphagy rather than a true heteroecy. If fundatrices were unable to mature on *Sedum*, populations which could pass the winter viviparously in sheltered places might persist and give rise ultimately to a permanently parthenogenetic race. A culture of *N. dasyphylli* from Kidlington sent to Dr. Hille Ris Lambers spon-

taneously colonised the flower stems of various Saxifragaceae and Crassulaceae, including *Saxifraga aizoon*, *Sedum album*, *Sedum anglicum*, *Sedum rupestre*, *Sedum sarmentosum* and *Sempervivum heuffelii*, and even formed colonies on senescing leaves of *Primula obconica* on a window-sill indoors. It seems possible that in its natural habitat *N. dasyphylli* may make use of the inflorescences of a number of species of *Saxifraga* and *Sedum* to provide it with a continuous succession of suitable niches through the season. The shortness of stems in the compact cushion-like habit of well-insolated plants presumably renders them unfavourable for the aphids except while flower stems are present, and this probably accounts for the habitat preferred by the aphids in their Oxfordshire locality, where the shade form of *Sedum dasyphyllum* shows a markedly laxer growth habit with elongation of the stem axes.

No attention is paid to *N. dasyphylli* by ants.

Taxonomy.—*Neokakimia dasyphylli* sp.n. is easily distinguishable from the only known aptera of the type species *N. saxifragae* Donc. and Str. by the much longer antennae, with processus terminalis much longer than joint III, and by the paler pigmentation of the legs and siphunculi. However, these differences are what would be expected if the type of *N. saxifragae* were a fundatrix, which is not improbable in view of the latitude of Jan Mayen Island. Comparison of first instar larvae of *saxifragae* and *dasyphylli* does suggest, however, that the difference is a real one, since in *dasyphylli* both the antennal joints and the apical joint of the rostrum are rather longer than in the young larvae of *saxifragae*. The ratio processus terminalis : width of frons for a first instar larva of *dasyphylli* is 58 : 42, for *saxifragae* 36 : 45.

According to Dr. Hille Ris Lambers (*in litt.*), who has seen the type material, *Neokakimia brevipes* (Börner) is characterised by a curious sack-shaped cauda, siphunculi only about one-eighth as long as the body, very short antennae with the processus terminalis and the third joint equal in length, and an apical rostral joint with only about 10 hairs. All these characters at once separate *brevipes* from *N. dasyphylli*.

Doncaster and Stroyan (1952) referred in a postscript to some material of a species of *Neokakimia* found on *Saxifraga aizoon* in Switzerland, and believed by Hille Ris Lambers at the time to be *brevipes* Börner. This is perhaps identical with the present species, but the available material is of larger size and more heavily pigmented than material of *dasyphylli* reared on *Saxifraga aizoon*.

Mr. J. P. Doncaster in 1943 trapped a single alata of a species of *Neokakimia* which does not entirely agree with *N. dasyphylli*. It seems likely, therefore, that at least one more British species of this very interesting subgenus awaits discovery on its host, which will probably be a species of *Saxifraga*.

Material examined.—Type series, apterae viviparae, holotype and 11 paratypes, Oxford : Kidlington, 3.vii.45 (*C. H. Gimingham*) ; topotypical material, 147 apterae and 34 alatae viviparae (9 brachypterous), including alate morphotype, 22.vi.54 ; 4 apterae viviparae, 17–26.vii.54 ; 5 apterae and 2 alatae viviparae, 21.ix–19.x.54 (*H. L. G. S.*). *Holotype* in British Museum (Natural History) ; morphotype alata in my collection ; topotypical material in the collections of the British Museum (Nat. Hist.), Dr. Hille Ris Lambers and Mr. C. T. Gimingham.

6. *Hyperomyzus* (*Neonasonovia*) *hieracii* (Börner, 1939). (Plate I, c).

This very little known species was first described by Börner (1939) as *Rhopalosiphoninus hieracii*. Later (1952) he placed it, presumably on the basis of the sclerotic adornment of the dorsum, in *Hyperomyzella* H. R. L., a subgenus with which it has in fact no close connection. Like *Hyperomyzus* (*Neonasonovia*) *picridis* (Börner), the present species forms a morphological link between the genera *Hyperomyzus* Börner and *Nasonovia* Mordv. In its pigmentation characters and host relationship with *Hieracium* it agrees perfectly with *Nasonovia*, while the swollen siphunculi and arrangement of the secondary rhinaria are more like those of *Hyperomyzus*.

H. hieracii is a very shiny dark warm brown aphid with long slender legs, living generally on the lower parts of *Hieracium* species, particularly the petioles of young leaves in the basal rosette ; much less often a few aphids may be found among the flower heads. According to Börner the plant shows no reaction. In the British locality curled basal leaves were present, but as a single specimen of *Nasonovia compositellae* was taken with the material of *hieracii* it is likely that the damage was due to the former species. The pigmented pattern of both apterae and alatae is similar to that of *Nasonovia nigra* (H. R. L.) and *N. compositellae* (Theob.). Secondary rhinaria are present on antennal joints III and IV in apterae, and on III–V or III and IV in alatae. Börner records their numbers as 20–22 on III for both apterae and alatae ; in the British material the numbers were : apterae, 14–23 on III, 2–6 on IV ; alatae, 26–33 on III, 6–12 on IV and 0–1 on V. The arrangement of the rhinaria is in a more or less straight single or only partly double row along the joints on which they occur. The siphunculi are uniformly dark, strongly swollen as in *Hyperomyzus* Börner, their maximum diameter being from about one and two-thirds to a little over twice the minimum diameter proximal to the swelling. The apical rostral joint is from 1·3 to 1·5 times as long as the rather short second joint of the hind tarsus, and bears 7–9 secondary hairs. First tarsal joint chaetotaxy appears to vary between 3, 3, 3 and 3, 3, 2 ; 4 hairs, as in *Hyperomyzella* H. R. L., are never present.

Measurements of specimens (Dalkeith, Midlothian, 8–9.vii.56) :

Apterous viviparous female : Body 2·09 mm., antennal flagellum 2·04 mm., flagellar joint ratios 38 : 20 : 16 : 5½ + 34½, siphunculus 0·45 mm., cauda 0·21 mm., caudal hairs 7, apical rostral joint 0·15 mm., second joint of hind tarsus 0·11 mm., secondary rhinaria on III 17 and 20, on IV 3 and 3.

Alate viviparous female : Body 2·05 mm., antennal flagellum 2·53 mm., flagellar joint ratios 47 : 24 : 18½ : 6 + 46, siphunculus 0·46 mm., cauda 0·21 mm., caudal hairs 6, apical rostral joint 0·15 mm., second joint of hind tarsus 0·11 mm., secondary rhinaria on III 31 and 33, on IV 12 and 10, on V 0 and 0.

The only British record to date is of apterae and alatae taken by the writer in company with Mr. A. G. Fisken on *Hieracium vulgatum* (Fr.) Almq. growing on a stone wall bounding a wood between Dalkeith and Pathhead, Midlothian, on 8–9.vii.1956. A slide of this material has been deposited in the British Museum (Natural History).

7. *Ericaphis latifrons* (Börner, 1942).

Described without host record by Börner (1942). Hille Ris Lambers (1955) has shown that this aphid is the same as *Ericaphis empetri* Ossiannilsson, 1954, basing his opinion on comparison of type material. *Myzodium lagarriguei* Remaud., 1952, from *Vaccinium uliginosum* in the Pyrenees, may also be the same. For excellent descriptions of the two latter species *see* Ossiannilsson (1954) and Remaudière (1952). The typical host is probably *Vaccinium uliginosum*, but *Empetrum nigrum* is also infested.

Mr. F. H. Jacob found material of *E. latifrons* on *Empetrum* at World's End, near Llangollen, DENBIGHSHIRE, on 20 and 26.viii.55. It has also been taken on *Empetrum* by Mr. M. W. Shaw at Loch Kander, near Braemar, ABERDEENSHIRE (SOUTH), on 25.vii.55. Outside Britain the recorded range is Iceland, Sweden, Germany and ? France (*lagarriguei*).

The genus *Ericaphis* has been extensively overlooked in the past, and species belonging to it have at various times been placed in *Myzaphis*, *Ovatus*, *Myzodium* and *Metopolophium*, with none of which (except possibly the last-named) it has any connection. Characteristic features of the two (possibly three) described species are the wrinkled sclerotic dorsum of the apterae, the finely dotted or striated border of the secondary rhinaria in the alatae, the presence of small spinal tubercles on the eighth tergite and the oblique outward-facing apex of the siphunculi. The genus is associated with species of Ericaceae and Empetraceae.

8. *Myzus* (*Nectarosiphon*) *ajugae* Schouteden, 1903.

This small darkish green *Nectarosiphon* species causes a tight curling up of the leaves of *Ajuga reptans* growing in deep shade. Microscopically it bears a strong resemblance to *M. certus* (Wlk.), the apterae being somewhat smoky yellowish on the dorsum, and both forms showing four to six secondary hairs on the basal half to three-fifths of the apical rostral joint, five and six being very frequent. This number of hairs distinguishes the species at once from *M. persicae* (Sulz.), which has only one pair as a rule, and the small size of the aphids together with their brownish-green colour when alive makes confusion with *M. certus* not very likely.

The only authenticated British record of *M. ajugae* at the present time is from Wisley Gardens, SURREY, Sept. 1954 (*D. Hille Ris Lambers* leg.).

Measurements of specimens :

Apterous viviparous female : Body 1·63 mm., antennal flagellum 1·24 mm., joint ratios (III–VI) 40 : 26 : 23 : 12 + 38, siphunculus 0·42 mm., cauda 0·16 mm., caudal hairs 6, apical rostral joint 0·114 mm., second joint of hind tarsus 0·090 mm., longest hair on ant. III 6 μ, articular diameter of joint 22 μ.

Alate viviparous female : Body 1·64 mm., antennal flagellum 1·56 mm., joint ratios (III–VI) 48 : 36 : 29 : 14 + 48, siphunculus 0·32 mm., cauda 0·15 mm., caudal hairs 6, apical rostral joint 0·110 mm., second joint of hind tarsus 0·096 mm., secondary rhinaria on ant. III 10 and 12, longest hair on ant. III 8 μ, articular diameter of joint 25 μ. (Both specimens from *Ajuga*, Bennekom, Netherlands, 29.vi.49).

9. **Brachycaudus jacobi** sp. n. (Plate III, B ; fig. 3).

Description drawn from one alate and one apterous viviparous female. In spite of the inadequate amount of material there appear to be sufficient

discriminants from related species to justify the description as a new species.

Apterous viviparous female : Macerated specimen. *Body* fairly slender, with rather long legs and antennae. General facies of *cardui* group, with paired mesosternal tubercles and solid pigmented dorsal carapace reaching to margins of abdomen. *Head* with very slight traces of lateral ocelli, *i.e.* slightly alatiform ; cephalic hairs very short and blunt. *Antennae* uniformly pigmented, joint III not much longer than IV, processus terminalis more than five times as long as basal part of VI, and longer than III and IV together ; joint III with 7 and 8 secondary rhinaria respectively, irregularly distributed in a line along the whole of the joint. *Antennal hairs* very short, those on III maximally not more than one quarter of the articular diameter of the joint. *Rostrum* about reaching hind coxae, apical joint 0·17 mm. long, with 8 secondary hairs which are up to 20 μ long ; the longest pair of primary hairs is up to 60 μ long. *Siphunculi* dark, similar to those of *B. cardui*, 6¼ times as long as their width at half length. *Cauda* semicircular, 0·3 times siphuncular length, without a basal constriction, with 6 hairs. *Eighth tergite* with 7 hairs in a single row, maximum length of hairs 0·09 mm. *Ventral body* hairs near mid-line of abdomen very long and acute, those on third sternite maximally 60 μ in length. *Dorsal body hairs* very short and blunt. *Subgenital plate* with 4 very long hairs on disc, maximally

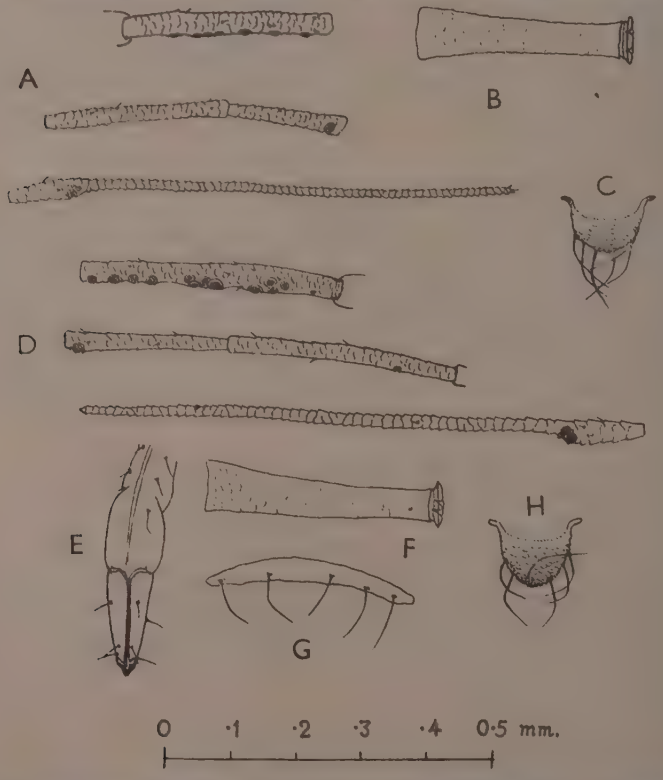

FIG. 3.—*Brachycaudus jacobi* sp. n. : apt. viv. ♀, A antennal joints III–VI, B siphunculus, C cauda ; al. viv. ♀, D antennal joints III–VI, E apex of rostrum, F siphunculus, G eighth abdominal tergite, H cauda.

0·09 mm. *Marginal tubercles* on pronotum about 12 μ in diameter, none apparent on abdomen.

Measurements of specimen, (Harpenden, Herts., 25.v.52): Body 1·73 mm., antennal flagellum 1·46 mm., joint ratios (III–VI) 35 : 29 : 19 : 13 + 68, siphunculus 0·30 mm., cauda 0·09 mm., second joint of hind tarsus 0·11 mm.

Alate viviparous female: Macerated specimen. Characters in general as for aptera. *Antennae* with processus terminalis almost equal to III + IV; joint III barely longer than IV, with 11 ? and 13 rhinaria respectively on the two sides; joint IV on each side with a single secondary rhinarium. *Siphunculi* almost four times as long as cauda. *Abdomen* with extensive dorsal pigmentation reaching to lateral margins on segments 3–7 inclusive, and with pigmented pleuroventral sclerites on 3–6 inclusive. A small *marginal tubercle* visible on abd. 2 on one side. *Eighth tergite* with 5 hairs. Disc of *subgenital plate* with 3 hairs, 2 very long and 1 shorter.

Measurements of specimen, (Harpenden, Herts., 25.v.52): Body 1·96 mm., antennal flagellum 1·71 mm., joint ratios (III–VI) 40 : 38 : 25 : 13 + 76, siphunculi 0·36 mm., cauda 0·09 mm., caudal hairs 6, apical joint of rostrum 0·17 mm., second joint of hind tarsus 0·12 mm.

Distribution.—Type material (holotype aptera and morphotype alata) from base of stems of *Myosotis arvensis* (L.) Hill, attended by ants; Harpenden, Hertfordshire, 25.v.52 (*F. H. Jacob* leg.)

Biology.—Nothing known apart from the data of the type material.

Taxonomy.—Brachycaudus jacobi apparently belongs to a small group of *Brachycaudus* species associated with Boraginaceae. Hille Ris Lambers (1931) proposed the new name *Brachycaudus mordvilkoi* for *Aphis symphiti* Koch, non Schrank, and cited as cotypes material collected by himself from *Echium vulgare* in Venezia Tridentina. Davatchi and Remaudière (1953) described a species *Brachycaudus iranicus* from apterae and sexuales taken in Persia on *Anchusa italica*. All three species of this group share a very long processus terminalis and a tendency for the production of alatiform apterae with secondary rhinaria on ant. III. Apart from differences in proportions of the antennal joints, extent of abdominal pigmentation and length of siphunculi, which tend to be unreliable discriminants in this genus, it has proved possible to separate the type material of the three forms by chaetotactic characters as follows:

1 (2) Antennal, cephalic and dorsal body hairs fairly long and acute (those on ant. III nearly as long as articular diameter of joint; cephalic and abdominal hairs one-fifth to one-seventh and one-sixth to one-eighth respectively of the interantennal width). **iranicus** Dav. and Rem.

2 (1) Antennal, cephalic and dorsal body hairs very short, blunt (those on ant. III not more than one-third articular diameter of joint; cephalic and abdominal hairs not more than about one-twentieth of the interantennal width).

3 (4) Hairs on eighth tergite very long, up to 90 μ. Mid-ventral hairs of third abdominal sternite up to 60 μ long. Longest pair of primary hairs on apical rostral joint 60 μ long, secondary hairs maximally 20 μ long. . . . . **jacobi** sp. n.

4 (3) Hairs on eighth tergite rather short, maximally 17 μ. Mid-ventral hairs of third abdominal sternite 8–14 μ (fourth sternite in one specimen with maximum 32 μ). Longest pair of primary hairs on apical rostral joint 40 μ long, secondary hairs maximally 10 μ long . . . . . **mordvilkoi** H.R.L.

The status of the name *mordvilkoi* H. R. L. is a little insecure. The only indications given by Hille Ris Lambers (1931) are the synonymy (*symphiti* Schrk. of Koch) and the host plant (*Echium vulgare*) from which his material was taken. Koch's description gives no clear indication enabling a decision to be taken as to whether he was dealing with *B. cardui* (L.) or another species, but Börner (1952) decided in favour of *cardui*, and made *mordvilkoi* a synonym of *cardui*. Since Koch left no types of his aphid species the point cannot well be established. *Brachycaudus cardui* certainly occurs on the upper parts of *Symphitum* and on other Boraginaceae. Material from *Echium* cannot be given the status of type material in the absence of an independent description; *mordvilkoi* was given as a new *name*, and its types must therefore be those of the original homonymous species, if any such types exist. If they do not, the only possible course is the designation of neotypes, which should agree so far as possible with the original description both morphologically and biologically. It is possible to accept Hille Ris Lambers' interpretation of *symphiti* Koch on the basis of the " first reviser " principle, but in view of the subjectivity of the synonymy it appears inappropriate to give the status of neotypes to his material from *Echium*, lest further developments should reverse the position, *e.g.* by revealing the existence of earlier interpretations of *symphiti* Koch as *cardui* L. In the circumstances the name *mordvilkoi* H. R. L. is used here for the species from *Echium* without prejudice to any possible renaming which may at a later date be found necessary.

The species is dedicated to Mr. F. H. Jacob, to whom I am indebted for the loan of the type material and for leave to describe it.

10. *Schizaphis agrostis* Hille Ris Lambers, 1947.
11. *Schizaphis holci* Hille Ris Lambers, 1947.
12. *Schizaphis laingi* Eastop, 1956.

Eastop (1956*a*) has pointed out that *Schizaphis graminum* (Rondani) and *S. jaroslavi* (Mordv.) are almost certainly erroneously included in the British list. The above three species, together with *S. geijskesi* H. R. L., represent the present known British members of the subgenus *Schizaphis* Börner, *sensu stricto*. Eastop (1956*a*) describes *S. laingi* as new from material in the collection of the British Museum (Natural History), and gives distributional data and an excellent key to the viviparae of the British species. He treats *S. agrostis* and *S. holci* as subspecies of *S. graminum* (Rondani).

Schizaphis laingi lies close to *S. nigerrima* H. R. L., from which it is distinguishable by a shorter processus terminalis and shorter siphunculi, and by a higher range of caudal hair numbers. Marginal tubercles are also present on abdominal segments 2–6 to a variable extent, while in *S. nigerrima* such tubercles do not occur. *S. laingi* is known so far only from material collected on various occasions by Mr. F. Laing from undetermined grasses.

13. *Aspidaphium escherichi* Börner, 1939.

The occurrence of a new species of *Aspidaphium* Börner, *A. cuspidati*, was recorded in a previous paper (Stroyan, 1955). In that account characters were given for the separation of *A. cuspidati* from *A. escherichi* Börner. The latter species has now been found in Britain, having been taken from litter

samples at Bagley Wood, Berkshire, on 7.iv.55. I am indebted to the finder, Mr. A. F. G. Dixon, for the opportunity to confirm and examine this material, and to Dr. Hille Ris Lambers for further confirmation based on first-hand knowledge of the type material. The host plant is considered to have been almost certainly the moss *Mnium hornum*.[1]

Measurements of 2 specimens (Bagley Wood, BK., 7.iv.55):

(1) *Apterous viviparous female*: Body c. 0·91 mm., antennal flagellum 0·42 mm., joint ratios (III–V) 43 : 25 : 20 – 19, siphunculi 0·18 mm., cauda 0·07 mm., apical joint of rostrum 0·09 mm., second joint of hind tarsus 0·07 mm. (2) *Apterous viviparous female*. Body c. 0·95 mm., antennal flagellum 0·42 mm., joint ratios (III–V) 45 : 25 : 17 – 17, siphunculi 0·18 mm., apical joint of rostrum 0·09 mm., second joint of hind tarsus 0·07 mm.

It may be added that in the British specimens seen the granulosity of the tibiae, referred to in the previous account (Stroyan, 1955), is not very conspicuous and must be carefully looked for under high magnification. A further interesting morphological feature common to both *A. eschericha* and *A. carpini* is the persistence in the adult apterae of a row of 4–5 recognisable "Rastralborsten" (Börner, 1952 : 244) on the middle portion of the hind tibiae.

Eastop (1956*b*) records an alata of *A. eschericha* trapped at Harpenden, Herts., by Dr. C. G. Johnson on 4.viii.51, and determined by Dr. Hille Ris Lambers. This is therefore the earliest British record, to which the finding of apterae brings satisfactory confirmation.

14. *Decorosiphon corynothrix* Börner, 1939. (Plate II, c).

This very distinctive small brownish-green species was first described (Börner, 1939) from moss in mixed woodland at Strem, Burgenland. The description was made from immature specimens only. Heinze (1956) gave a full description of the adult forms from material taken on *Polytrichum commune* at Bad Meinberg, Lippe, and in three localities in the Netherlands (the latter collected by Dr. Hille Ris Lambers). The forms of this aphid are quite unmistakable from the long, stiff, erect hairs clothing the head, legs and antennae (see Pl. II, c). The apterae sit low down on the brown basal portion of the stems of *Polytrichum* growing luxuriantly in damp situations in woods.

British records to date are from Surrey: Wisley, R. H. S. Gardens, 30.x.54 (*D. Hille Ris Lambers, J. P. Doncaster* and *H. L. G. S.*); Hertford: Symondshyde Great Wood, on *Atrichum undulatum* (Hedw.), P. Beaver 23.iv.57 (*R. N. B. Prior*); Caernarvon: Near Llyn Ogwen and in Cwm Idwal, 3.v.54 (*F. H. Jacob*); and Aberdeen: One aptera beaten from *Galium rotundifolium* (? perhaps mixed with *Polytrichum*). Aberdeen, 5.ix.55 (*M. W. Shaw*).

[1] A further record of *A. eschericha* is provided by Mr. R. N. B. Prior, who collected immature forms on a species of *Eurhynchium praelongum* Hedw. [Hobk.], growing round a flooded bomb crater in Symondshyde Great Wood, near Hatfield, Herts., on 24.ii.57. The apterae reared from these were shiny coarsely brown, and in life showed no sign of the hydrofuge air tracts described in *A. Cinaridoni* Stroyan. The moss on which they lived was in close proximity to the water but not growing in it. The aphids would not transfer readily to *Mnium hornum* in the laboratory.

15. *Lipaphis matthiolae* Doncaster, 1954.

For the original account of this species, taken from *Matthiola* sp. at Whittingham, NORTHUMBERLAND (NORTH), and from *Arabis alba* at Bangor, CAERNARVON, *see* Doncaster (1954*b*).

16. *Lipaphis cochleariae* Jacob, 1956.

Jacob (1956) has described the apterous viviparous females of this species from material collected at Menai Bridge, ANGLESEY, on *Cochlearia officinalis*. Subsequently the writer and Mr. J. P. Rogerson have collected the species in quantity from *Cochlearia* in a tidal creek at Seahouses, NORTHUMBERLAND (NORTH), and obtained sexual forms and fundatrices. A description of these forms follows below.

Colour of all forms similar to that of apterae, but males appearing rather darker owing to the greater relative area of pigmented sclerites. *Wax adornment* as described for apterae.

Microscopic Morphology.

Male: Apterous. *Body* 1·07–1·29 mm. *Sclerotic pattern* on body similar to that of apterae, but relatively much more extensive; the abdominal sclerites tend to fuse across the segmental boundaries, the result being to give a generally blackish appearance with narrow mid-dorsal and pleural membranous lines, the latter bearing the intersegmental muscle sclerites which are also deeply pigmented. *Antennae* 6-jointed, uniformly dark sclerotic, adorned with rather thick-rimmed and often imperfect secondary rhinaria on III, IV and V, and occasionally also with an odd one on the base of VI. Observed rhinarial numbers in 10 specimens (19 antennae): III 15–29, IV 9–16, V 2–8, VIb 0–1; calculated limits of variation (mean ± 3 S.D.): III10–31, IV 5–17, V 1–9. *Antennal* and *cephalic hairs* up to a maximum of about 8 μ long, or nearly half diameter of articulation of ant. III. *Rostrum* reaching not quite to hind coxae, apical joint rather short and blunt, with 4 (–5 ?) secondary hairs. *Siphunculi* as in apterae, rather vasiform, narrowing rather markedly from about three-fourths to just before the flange. *Cauda* rather short, subtriangular, with 5 hairs, of which the apical one is typically shorter than the 2 lateral pairs. *Dorsal body hairs* similar in length to antennal and cephalic hairs, blunt at apex; *ventral hairs* rather longer, between blunt and acute, not fine-pointed.

Measurements of 3 specimens (Seahouses, NN, 13.x.55):

Body.	Ant. flag.	Joint ratios (III–VI).	Siph.	Cau.	A.j.r.	2.h.t.	Rhinaria. III.	IV.	V.	VIb.
1·25	0·79	27 : 14 : 14 : 11 −22	0·15	0·08	0·09	0·10	24/21	16/13	6/6	1/1
1·11	0·73	24 : 14 : 13 : 10 −21	0·15	0·08	0·10	0·09	25/29	11/11	6/5	0
1·07	0·62	23 : 12 : 11 : 9′ +14	0·12	0·08	0·09	0·10	16/17	10/11	2/4	0

All lengths measured in millimetres.

Oviparous female: Closely resembling apterous viviparous female but with *hind tibiae* rather markedly incrassate over basal two-thirds of their length, and adorned with about 50–70 "pseudosensoria" or scent plaques. The description of the apterae viviparae otherwise applies to the oviparae.

Measurement of 3 specimens (Seahouses, NN, 13.x.55):

Body.	Ant. flag.	Joint ratios (III-VI).	Siph.	Cau.	Cdl. hrs.	A.j.r.	2.h.t.
1·71	0·74	28 : 12 : 12 : 10+21	0·18	0·14	5	0·10	0·10
1·71	0·83	31 : 13 : 15 : 12+22	0·20	0·14	5	0·10	0·11
1·55	0·63	23 : 10 : 11 : 9 +17	0·16	0·13	5	0·10	0·10

All lengths measured in millimetres.

Fundatrix (from 2 specimens): Similar to and not appreciably larger than summer apterae, but with shorter 5- jointed *antennae* and a tongue-shaped rather than subtriangular *cauda*, i.e. with the sides more convex. *Frons* less deeply sinuate than in summer apterae. The description of the apterae otherwise applies to the fundatrices.

Measurements of 2 specimens (*ex* culture, Seahouses, NN, 11.v.56):

Body.	Ant. flag.	Joint ratios (III–V).	Siph.	Cau.	Cdl. hrs.	A.j.r.	2.h.t
1·81	0·62	32 : 11 : 11+15	0·16	0·12	3	0·11	0·10
1·75	0·67	35 : 12 : 12+16	0·17	0·12	4	0·11	0·10

All lengths measured in millimetres.

Biology.—The eggs, which are at first orange-yellow and later turn shiny black, are laid under the leaves and on the leaf petioles of the basal rosette of *Cochlearia officinalis* during the period from the middle of October to the beginning of December (observations made on a garden culture). The young fundatrices hatch towards the middle or end of April, and live in the inflorescences until mature, which in the present year was towards the end of the second week of May (1956). The mature fundatrices then apparently move down from the inflorescences, which are going to seed, and live lower down the stems or in the rosette. At this period the plant from which the notes given here were taken was very heavily infested with *Myzus ascalonicus* Donc., and the culture of *Lipaphis* unfortunately succumbed to the excessive competition before later generations could be reared.

Distribution.—See introductory paragraph. The species is not as yet recorded outside the British Isles.

17. *Lipaphis turritella* (Wahlgren, 1938).

Eastop (1956*b*) records that there are specimens of this species in the Theobald collection in the British Museum (Natural History) under a manuscript name. The data are *Arabis* (= *Turritis*) *glabra*, SURREY, August, 1924. *Brachycolus turritellus* Wahlgren was placed by Börner in his subgenus *Lipaphidoides* (1939), which Doncaster (1954*b*) rejects, together with its earlier synonym *Smiela* Mordv.

18. *Hydaphias hofmanni* Börner, 1950.

This name was given by Börner (1950) to *Aphis bicolor* Koch, a homonym of *Aphis bicolor* Haldeman, 1844, from the United States. Börner later (1952) queried whether *Hydaphias helvetica* H. R. L., 1947, is not a seasonal form of the same species, in which case it will take priority over *H. hofmanni*. Meanwhile Börner's name is used here.

H. hofmanni lives basally on *Galium verum*, attended by ants. The general form is *Aphis*-like, but the absence of the characteristic distribution of marginal tubercles on abd. 1 and 7 removes the genus from the subfamily Aphidinae in Börner's sense. Both alatae and apterae have the dorsum membranous without a central abdominal sclerotic area. The siphunculi are very typical, having no trace of a flange and a very small porus in the rounded membranous operculum. The cauda has a rather large number of hairs. Apterae have a small number of secondary rhinaria on the distal part of ant. III (3–9 in British

material); alatae have the rhinaria more numerous and arranged along the whole length of the third joint. The eighth tergite has a rather large number of hairs (9–12) which are very variable in length (12–42 μ) and apically blunt. The hairs on ant. III are fine, acute and from three-fifths to two-thirds as long as the articular diameter of the joint.

The only British record to date is of apterae and an alata taken from *Galium verum* at Bristol, Gloucester (West), on 27.vi.1947. I am indebted to Mr. H. G. Morgan for the loan of this material for examination and determination.

Measurement of 2 specimens (Bristol, 23.vi.47).

Apterous viviparous female: Body 1·88 mm., antennal flagellum 1·05 mm., joint ratios (III–VI) 38 : 21 : 17 : 13 + 28, siphunculus 0·21 mm., cauda 0·25 mm., caudal hairs 12, apical joint of rostrum 0·12 mm., second joint of hind tarsus 0·12 mm., secondary rhinaria on III 7 and 6.

Alate viviparous female: Body 2·07 mm., ant. flagellum 1·27 mm., joint ratios (III–VI) 44 : 24 : 22 : 16 + 36, siphunculus 0·18 mm., cauda 0·21 mm., caudal hairs 12, apical joint of rostrum 0·11 mm., second jt. hind tarsus 0·14 mm., sec. rhin. III 16 and 15.

19. *Aphis comosa* (Börner, 1950). (Plate II, B).

Börner (1950) first described this species as *Doralida comosa*. He placed *Doralida* Börner as a subgenus of *Pergandeida* Schouteden, and in 1952 added as a queried synonym of *comosa* Walker's *Aphis dissita*. However, Walker (1849) described his *dissita* from a single alate aphid (probably a vagrant) found on *Lathyrus odoratus*, and with legs dark brown or nearly black except for the bases of the femora, and the antennae nearly as long as the body. Alatae of *Pergandeida* have the tibiae to a greater or lesser extent pale, and the antennae are considerably shorter than the body; it is therefore rather improbable that *A. dissita* is a synonym of *comosa*, which lives on *Lathyrus pratensis* and *Melilotus albus*.

The character given by Börner for separation of *comosa* from *P. craccivora* (Koch) is the long, acute tibial hairs, which are about as long as the tibia is thick. I do not find this to be a reliable difference in my material, since there is a good deal of overlap in the ranges of variation for this character between the two species. I find the caudal hair numbers of *comosa* to be higher in my material than those given by Börner (12–14 as against 7–10), while my specimens of *craccivora* have 4–7 caudal hairs. The hairs on the third antennal joint are longer on an average in *comosa* than in *craccivora*, though with some overlap (16–22 μ in *comosa*, 9–19 μ in *craccivora*). A similar relationship also exists in the lengths of the hairs on the abdominal tergites. A rather constant feature of both British and Swedish apterae in my possession is a more or less distinct darkening of the base of the third antennal joint; in *P. loti* (Kltb.), *P. craccivora* (Koch), *P. klimeschi* Börner, *P. scaliai* (Del G.) and *P. medicaginis* (Koch) such darkening, if present, seems to be confined to the apex of the third joint.

Apterous viviparae of *P. comosa* (Pl. II, B) have the abdominal dorsum shiny black in life, as in the other members of Börner's subgenus *Doralida*, and more or less solidly sclerotic to the body margins. In autumn apterae the sclerotisation may be weakened and reduced in area in the manner typical for the genus, giving a highly irregular mosaic pattern of alternating sclerotic

and membranous areas corresponding to the individual cuticular reticulations. Oviparae have the abdominal dorsum membranous, the sclerotisation of the subgenital plate more or less divided medially, and the hind tibiae pale and only slightly thickened, with rather few inconspicuous scent plaques from about one-quarter to three-quarters of their length. The colonies are attended by ants.

Measurements of specimens :

Body.	Ant.	Joint ratios (III–VI).	Siph.	Cau.	A.j.r.	2 h.t.	Longest hair/III (μ).	Form.
1·97	0·95	34 : 24 : 20 : 13+28	0·26	0·19	0·12	0·11	20	Apt.
1·41	0·84	28 : 18 : 17 : 12+30	0·22	0·18	0·11	0·11	16	,,
1·83	0·93	34 : 23 : 19 : 13+27	0·28	0·19	0·13	0·11	21	,,
1·73	0·78	28 : 16 : 16 : 13+25	0·22	0·21	0·12	0·10	19	,,
1·95	0·90	32 : 20 : 19 : 13+29	0·22	0·21	0·12	0·11	22	,,
1·66	0·84	26 : 18 : 18 : 13+30	0·18	0·19	0·12	0·10	19	Ovip.

Nos. 1–3 from *Lathyrus pratensis*, Betws-y-Coed, Caerns., 28.vii.54; 4–6 from *L. pratensis*, Linné's Hammarby, Uppsala, Sweden, 11.viii.48 (*H. L. G. S.*). All length measurements in mm. Antennae measured without joints I and II.

As a British species this aphid is so far only recorded from CAERNARVON (see above). It will probably prove to be more widely distributed on *Lathyrus pratensis*. I have not yet seen material from *Melilotus albus*.

20. *Aphis helianthemi* Ferrari, 1872.

A very small, rather bright pale green species, living at the roots of *Helianthemum chamaecistus* Mill., and attended by ants. The aphids are hard to collect owing to the tough and wiry stems of the host plant, and usually manage to disappear into a gallery of the earthen heaps built up by the ants to enclose the lower parts of the infested plant.

Apterous viviparous females : Antennae 5- or 6-jointed, with *processus terminalis* 2·1–2·2 times the basal part of joint VI (V). *Marginal tubercles* present on abd. 1–7 inclusive, or only absent from one or two segments between 1 and 7. *Antennal hairs* very small, only about one-quarter or less of the articular diameter of the third joint in length. *Dorsal abdominal hairs* hardly longer, apart from those of eighth tergite, which are about three times as long as the antennal hairs and 2 in number. *Rostrum* varies from 0·40 to 0·43 mm. in total length in the British specimens available ; apical joint equal to or fractionally longer than cauda, with one pair of secondary hairs.

Measurements of 2 specimens (Bristol, 27.vi.56) :

Apterous viviparous females. (1) Body 1·08 mm., antennal flagellum 0·62 mm., flagellar joint ratios 14 : 10 : 11 : 10 + 24, siphunculus 0·13 mm., cauda 0·10 mm., caudal hairs 7, apical joint of rostrum 0·11 mm., second joint of hind tarsus 0·08 mm. (2) Body 0·81 mm., antennal flagellum 0·51 mm., flagellar joint ratios 18 : 10 : 9 + 20, siphunculus 0·09 mm., cauda 0·09 mm., caudal hairs 6, apical joint of rostrum 0·10 mm., second joint of hind tarsus 0·07 mm.

The only known British record at present is of apterae and larvae collected from *Helianthemum chamaecistus* on Clifton Down, Bristol, GLOUCESTER (WEST), 27.vi.56 (*H. L. G. S* leg.). The species is almost certainly widely overlooked owing to its very small size and concealed habitat.

21. *Aphis longirostris* (Börner, 1950).

According to Börner (1950) this species is distinguished from all other species of the genus (*Cerosipha* Del G., in which it was originally placed) by the very long rostrum, which is 1·2–1·3 times as long as the hind tibiae. Other characters given are :

Siphunculi a little longer than or as long as cauda ; processus terminalis somewhat longer than third antennal joint ; large marginal tubercles present on abd. 1–7, frequently absent from abd. 5.

The species was described from the rosettes of *Plantago maritima* at Neusiedler See, Austria.

A small colony of dark green *Aphis* collected from the rosettes of *Plantago maritima* at Polruan-by-Fowey, Cornwall, in September, 1955 was found to agree rather well with Börner's description of *longirostris*. The aphids were attended by a species of *Myrmica*. Unfortunately a high wind made collecting difficult, and only three adult apterae were finally secured from the collecting board.

The species may be easily separated from *Aphis plantaginis* Schrank by the very short hairs on the coxae and eighth abdominal tergite (those on coxae maximally 13–16 μ, those on eighth tergite maximally 10–12 μ long) and by the shape of the cauda, which is rather elongate triangular and nearly straight-sided. In *A. plantaginis* the coxal hairs and those of the eighth tergite are much longer, maximally about 25–35 μ long, and the cauda is of the typical finger-like shape, nearly parallel-sided for most of its length with a blunt apex. The rostral length is not satisfactory as a discriminant between the two species, since the absolute lengths show overlapping. The relative lengths of siphunculi and cauda are also unreliable in the genus *Aphis*, and the three Cornish apterae have siphunculi ranging from about one-and-a-half times to nearly twice as long as the cauda.

Measurements of specimens.:

Body.	Ant. flag.	Joint ratios (III–VI).	Siph.	Cau.	Cdl. hairs.	A.j.r.	2.h.t.
1·53	0·69	21 : 11 : 11 : 10+24	0·21	0·14	7	0·13	0·08
1·38	0·66	19 : 10 : 11 : 10+24	0·21	0·12	7	0·14	0·08
1·34	0·63	17 : 10 : 11 : 9 +24	0·18	0·12	7	0·13	0·08

All lengths expressed in millimetres.

Plantago maritima, East Cornwall : Polruan-by-Fowey, 13.ix.55 (*H. L. G. S.* leg).

22. *Aphis mirifica* (Börner, 1950),

Described by Börner (1950) as *Doralina mirifica*, with the following indication :

" Closely related to *D. epilobiina* Wlk. (sensu Theob.). Processus terminalis shorter (1·8 to 2·1 times base ; in *epilobiina* 2·0 to 2·8 times). Male with thorax sclerotised all

round, but without wings. Ovipara with weakly swollen hind tibiae. Pale bluish-green with whitish appendages, siphunculi blackish, male olive-greenish with dark head and thorax, 1·5 to 1·8 mm. On stem base of *Epilobium angustifolium* (*epilobiina* heteroecious between this plant and *Frangula alnus*)." (*tr. H. L. G. S.*).

A sample of aphids taken from *Chamaenerion angustifolium* at Reading, Berks., 9.vi.51 (*B. Steele* leg.) is apparently referable to this species. The date nearly precludes migration from *Frangula*, since mature apterae were already present. Additional characters derived from apterae of this sample are :

Marginal tubercles present on pronotum and abd. 1–4 + 7 or 1–7 inclusive ; *antennal hairs* on joint III maximally 12 μ, articular diameter of III about 22 μ ; hairs on *eighth tergite* maximally 20 μ ; *coxae* long-haired.

Measurements of 2 specimens (Reading, BERKSHIRE : 9.vi.51) :

Apterous viviparous females : (1) Body 1·86 mm., antennal flagellum 0·97 mm., ratios of joints III–VI 28 : 17 : 17 : 13 + 22, siphunculi 0·19 mm., cauda 0·18 mm., caudal hairs 5, apical joint of rostrum 0·10 mm., second joint of hind tarsus 0·12 mm. (2) Body 1·85 mm., antennal flagellum 1·09 mm., ratios of joints III–VI 28 : 20 : 20 : 15 + 26, siphunculi 0·18 mm., cauda 0·19 mm., caudal hairs 7, apical joint of rostrum 0·12 mm. (total length of rostrum to base of retractor apodeme 0·55 mm.), second joint of hind tarsus 0·12 mm.

The material is in the British Museum (Natural History). I am indebted to Dr. V. F. Eastop for notification of the record.

23. *Aphis origani* Passerini, 1860.

This is one of the very confusing species-group attached to species of Labiatae, which would seem to be sorely in need of some thorough biological investigation ; such an investigation might well lead to a reduction in the number of species recognised as distinct by Börner (1952). The absence of *A. origani* from the British list is probably due rather to lack of recognition than to rarity. According to Mr. J. P. Doncaster there is material from *Origanum* in the collection of the British Museum (Natural History) from Seal, WEST KENT, 30.vi.38 (*S. G. Jary* leg.).

A further record is provided by the finding of abundant material curling the leaves of *Origanum vulgare* in the Avon Gorge, Bristol, on 27.vi.56 (*H. L. G. S.* leg.). The aphids were attended by ants of the genus *Myrmica*. From this material the following data were obtained

Secondary rhinaria on ant. III in alatae	4–8, mode 2
Secondary hairs on apical rostral joint	2–3, mode 2
Number of hairs on eighth abdominal tergite	2–4, mode 2
Maximal hair lengths :	
Hind coxae, apterae	28?–36 μ
,, ,, alatae	20–32 μ
Eighth tergite, apterae	14–18 μ
,, ,, alatae	16–24 μ
Antennal joint III, apterae	6–9 μ
,, ,, ,, alatae	8·11 μ

(Articular diameter of ant. III varies from 16 μ to 20 μ).

Measurements of single specimens (Bristol, Gloucester (West), 27.vi.56):

Apterous viviparous female: Body 1·53 mm., antennal flagellum 0·83 mm., flagellar joint ratios 22 : 17 : 16 : 12 + 26, siphunculus 0·18 mm., cauda 0·16 mm., caudal hairs 6, apical joint of rostrum 0·10 mm., second joint of hind tarsus 0·08 mm.

Alate viviparous female: Body 1·61 mm., antennal flagellum 1·17 mm., flagellar joint ratios 33 : 24 : 24 : 14 + 36, siphunculus 0·20 mm., cauda 0·13 mm., caudal hairs 6, apical rostral joint 0·10 mm., second joint of hind tarsus 0·09 mm., sec. rhin./III 4 and 5.

24. *Aphis passeriniana* (del Guercio, 1900).

Originally described from *Salvia splendens* in Italy, this species was somewhat doubtfully identified by Börner (1952) from material taken on *S. officinalis* in Berlin. In April, 1955, material from *S. officinalis* at Genoa was given to Dr. Hille Ris Lambers and myself by Dr. F. Capra of the Museo Civico di Storia Naturale, Genoa. We arrived separately at the above identity for this material. Subsequently the same species was taken in abundance on *S. officinalis* in the Botanic Garden, Cambridge, by Miss J. M. W. Hurrell. This appears to be the first British record of the species.

A. passeriniana about midsummer forms colonies in the inflorescences and on the young shoots of *Salvia officinalis*. The aphids are medium to dark green, rather pulverulent, with the siphunculi in apterae rather pale to brownish with darker apices. Fundatrices have 5-jointed antennae and shorter antennae, legs and siphunculi than the later generations.

The most reliable characters for separation of *passeriniana* from other members of the species-group on Labiatae would seem to be the relatively very short second joints of the hind tarsi and the rather large number of secondary rhinaria on the antennae in the alatae. The ratio of the length of the apical rostral joint to the second hind tarsal joint ranges from 1·75 to 2·00 in apterae of *passeriniana*, as against 1·50 or less in other members of the group, with the exception of some specimens of *A. serpylli* Koch; but the size of the latter is so much smaller that confusion is impossible unless "summer dwarfs" of *passeriniana* were involved, in which case the pale coloration of the dwarfs would assist recognition. The rhinarial distribution in alatae of *passeriniana* from Cambridge (20 specimens) is: III 7–12, mean 9·13; IV 0–3, mean 1·13; V 0–1, mean 0·08 per antenna. In other species of the group for which rhinarial data are available (*origani* Pass., *teucrii* Börner, *stachydis* Börner, *verticillatae* Börner and *serpylli* Koch) the number of rhinaria on III does not exceed eight. A further feature of alatae from the Cambridge material is the reduction of pigmentation of the marginal abdominal sclerites and the spinal sclerites of abd. 6–8 inclusive; the latter in particular being small and inconspicuous in contrast with the dark and well-developed postsiphuncular sclerites. This character has not been seen so far in other species of the Labiatae group.

Measurements of specimens:

Fundatrix: Body 1·48 mm., antennal flagellum 0·66 mm., flagellar joint ratios 33 : 14 : 9 + 18, siphunculus 0·21 mm., cauda 0·11 mm., caudal hairs 7, apical rostral joint 0·13 mm., total length of rostrum 0·38 mm., second joint of hind tarsus 0·07 mm. (*Salvia officinalis*, Genoa, Italy, 10.iv.55 (*F. Capra* leg.)).

Apterous viviparous female: Body 1·78 mm., antennal flagellum 0·97 mm., flagellar joint ratios 34 : 20 : 21 : 12 + 22, siphunculus 0·24 mm., cauda 0·14 mm., caudal hairs

5, apical rostral joint 0·14 mm., second joint of hind tarsus 0·08 mm. (*Salvia officinalis*, Cambridge, CAMBRIDGESHIRE, 15.vi.55 (*J. M. W. Hurrell* leg.)).

Alate viviparous female : Body 1·86 mm., antennal flagellum 1·01 mm., flagellar joint ratios 37 : 19 : 21 : 12 + 24, siphunculus 0·23 mm., cauda 0·11 mm., caudal hairs 8, apical joint of rostrum 0·14 mm., second joint of hind tarsus 0·08 mm., secondary rhinaria on ant. III 10 and 11, on IV 2 and 0 (*Salvia officinalis*, Cambridge, CAMBRIDGESHIRE. 15.vi.55 (*J. M. W. Hurrell* leg.)).

25. *Aphis pilosellae* (Börner, 1952).

This species was originally described very shortly by Börner (1940) as *Cerosipha hieracii*. In 1952 it was renamed by him *pilosellae* on the grounds of secondary homonymy with *Aphis hieracii* Schrank, 1801, placed by Börner in *Cerosipha*. Hille Ris Lambers (1956) redescribed the species as *Aphis pilosellae* sp. n., having overlooked the renaming by Borner, but expressed some doubt as to the identity of the two species, owing to the omission by Börner of any reference to the very characteristic long ultimate rostral joint of *pilosellae* H. R. L. He has since (personal communication) signified his belief that they are in fact one and the same species, which therefore remains under Börner's name of 1952.

Apart from the very long apical rostral segment the principal noteworthy character of *pilosellae* is the typically five-jointed antenna in both apterous and alate viviparae. This character, while frequent in apterae of the smaller *Aphis* species, is much less so in alatae. Another valuable character is the large, rather flatly rounded marginal tubercles. For a complete description see Hille Ris Lambers (1956). The species lives on the runners and under the basal rosettes of *Hieracium pilosella*.

British records of *Aphis pilosellae* are from KENT (EAST) : Dungeness, 18.vi.50 ; SUSSEX (EAST) : Camber, 18.vi.50 (*V. F. Eastop* leg.) ; and GLOUCESTER (WEST) : Avon Gorge, Bristol, 27.vi.56 (*H. L. G. S.* leg.).

26. *Aphis serpylli* Koch, 1854. (Fig. 4).

An extremely small dark green species, belonging to the as yet little worked out species-group on Labiatae (see *A. origani* Pass.). Hille Ris Lambers (1947) described it as " In Europa noch wenig gefunden aber wahrscheinlich häufig ". The lack of British records heretofore is almost certainly due to the species having been overlooked on account of its very small size. It is apparently always attended by ants.

So far only known from near Criccieth, CAERNARVON : on *Thymus serpyllum* L. agg., probably *T. drucei* Ronn., 4.viii.54 (*F. H. Jacob*).

Measurements of specimens :

Apterous viviparous female : Body 1·18, antenna 0·56, joint ratios (III–VI), 37 : 24 : 27 : 24 + 44, siphunculus 0·10, cauda 0·11, caudal hairs 5, apical joint of rostrum 0·08, second joint of hind tarsus 0·06, longest visible hair on ant. III 7 μ, articular diameter of ant. III 13 μ.

Apterous male : Body 1·06, ant. 0·74, joint ratios (III–VI) 48 : 42 : 38 : 30 + 49, siph. 0·08, cauda 0·09, caudal hairs 5, apical jt. of rostrum 0·08, secondary rhinaria on ant. III 15 and 18, on IV 9 and 13, on V 6 and 6, on basal part of VI 2 and 2.

Oviparous female: Body 1·10, ant. 0·53, joint ratios (III–VI) 31 : 22 : 26 : 23 + 41, siph. 0·07, cauda 0·11, caudal hairs 6, apical jt. of rostrum 0·08, second jt. hind tarsus 0·06, pseudosensoria on hind tibiae 61 and 54.

All specimens from *Thymus serpyllum* L. in culture *ex* Criccieth, 20.ix.54 (*F. H. Jacob*). Length measurements in mm. where not otherwise stated; antennae measured without joints I and II.

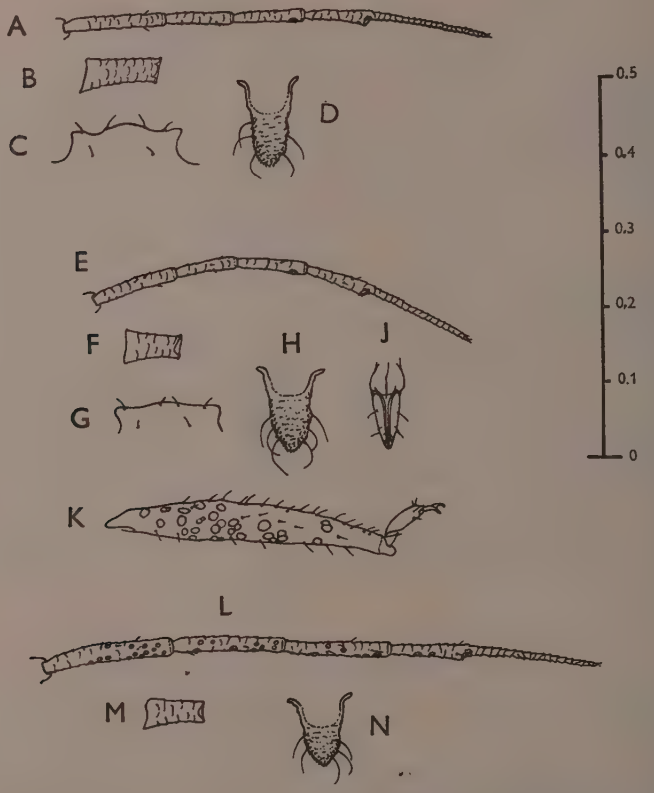

Fig. 4.—*Aphis serpylli* Koch: apt. viv. ♀, A antennal flagellum, B siphunculus, C frontal outline and hairs, D cauda; ovip. ♀, E antennal flagellum, F siphunculus, G frontal outline and hairs, H cauda, J apex of rostrum, K hind tibia; apt. ♂, L antennal flagellum, M siphunculus, N cauda.

27. *Aphis verbasci* Schrank, 1801.

The only published record of this species up to the present time is of heavy infestations found on leaves of *Verbascum phlomoides* at Ilford, Essex (South), in July, 1952 (Doncaster, 1954*a*). The species is also recorded by Börner (1952), following Hille Ris Lambers, from *Verbascum sinuatum* and *Buddleia* sp.

28. *Thripsaphis verrucosa* (Gillette, 1917).

First described from North America by Gillette (1917) as *Thripsaphis verrucosa*, this aphid was later described by Börner (1939) from Europe as *Thripsaphis leporinae*. Palmer (1952) cites *Carex nebraskensis* as a host plant in Colorado. Börner's species was found on *C. leporina*. Quednau (1954), who establishes the synonymy of the two, quotes *Carex goodenoughii* (*sic*). The synonymy is used here without comment; I have not seen North American material. The diagnostic character of this species is the pronounced almost rectangular tubercle projecting from the middle of the frons, which is quite unmistakable, other known species having the frons rounded.

The British status of *T. verrucosa* rests at present on alate viviparae identified from sticky trap catches from Wooler, Northumberland (North) (2), and Brampton, Cumberland (1), in 1955 (*J. P. Rogerson* leg.); and on a single apterous male thrashed from a mixture of *Carex* species at Ribblehead, Mid-West Yorkshire, on 12.ix.1953 (*H. L. G. S.* leg.).[2] As the latter form does not appear to have been described some brief notes follow.

Apterous male: Colour pale yellow-green. *Body* elongate, very slender, widest at prothorax, then sharply narrowed on mesothorax and thereafter nearly parallel-sided. *Cuticle* throughout yellowish sclerotic with rather sparse scaly sculpture, denser at body margins. *Frons* with very large median process, whose width at half height is about two-thirds the interantennal width, and which bears 2 pairs of hairs apically of maximum length about 52 μ. *Antennae* with flagellum about three-fifths body length, with rather sparse small secondary rhinaria on joints III–VI inclusive (confined to basal portion on the latter); uniformly brown sclerotic throughout, rather darker than *legs*, which have the tibial apices and tarsi slightly darker than the rest. *Genitalia* characteristic, with very blunt and rounded claspers having a deep cleft between them medially; aedeagus (sclerotic basal part of phallus) very short and poorly developed, consisting of a pair of roughly triangular plates which do not fuse medially.

Measurements of specimens:

(1) *Apterous male:* Body 1·92 mm., antennal flagellum 1·29 mm., joint ratios (III–VI) 49 : 26 : 30 : 20 + 19, cauda 0·15 mm., apical joint of rostrum 0·07 mm., second joint of hind tarsus 0·14 mm., secondary rhinaria on III 16 and 14, on IV 6 and 5, on V 7 and 6, on base of VI 2 and 4, hairs on III maximally 12 μ, articular diameter of III 20 μ, hairs on eighth tergite up to 50 μ (*Carex* sp., Ribblehead, 12.ix.53).

(2) *Apterous viviparous female:* Body 3·02 mm., antennal flagellum 1·54 mm., joint ratios (III–VI) 67 : 33 : 33 : 21 + 18, cauda 0·12 mm., apical joint of rostrum 0·08 mm., second joint of hind tarsus 0·16 mm., secondary rhinaria on III 5 and 4, hairs on III maximally 16 μ, articular diameter of III 27 μ, hairs on eighth tergite up to 50 μ (Karlskoga, Värmland, Sweden, 13.vii.54 (*F. Ossiannilsson* leg.)).

(3) *Oviparous female:* Body 2·77 mm., antennal flagellum 1·46 mm., joint ratios (III–VI) 62 : 30 : 32 : 20 + 20, cauda 0·14 mm., apical rostral joint 0·09 mm., second joint of hind tarsus 0·16 mm., secondary rhinaria on III 3 and 4, hairs on III maximally 16 μ, articular diameter of III 24 μ, hairs on eighth tergite up to 44 μ in length (swept in Eriophoretum, Berwang, Tirol, Austria, 2.ix.56 (*H. L. G. S.* leg.)).

[2] Eastop (1956*b*) states that *Thripsaphis leporinae* occurs in Britain, and quotes records from Hill of Fare, Kincardine, on 17 and 29.ix.44 (*G. D. Morison* leg.). These are apparently the earliest records, and represent an extension of the range recorded above.

29. *Chaitophorus albus* Mordvilko, 1901.

Eastop (1956*b*) quotes records of this species from HERTFORDSHIRE, BERKSHIRE and CAMBRIDGESHIRE. To these may be added further records from Cambridge with the following data: (1) *Populus alba*, 4.vi.54 (*J. M. W. Hurrell* leg.); (2) *Populus alba* and *P. canescens* × *tremula*, 12–15.vi.54 (*H. L. G. S.* leg.).

The following brief key is offered for the separation of the British species of *Chaitophorus* Koch living on poplar and aspen.

1 (2) Antennal hairs quite erect, the longer hairs equally distributed round the joints or nearly so, not predominantly or exclusively forward-pointing. Dorsal body hairs of apterae at least partially truncate or furcate at apex. Hind tibiae of viviparae with a few pseudo-sensoria (scent plaques). On *Populus alba* and *tremula*; also recorded in error from *Betula* . . . . . **populeti** (Panzer) (*betulinus* v.d.G.)

2 (1) Antennal hairs not quite erect, somewhat inclined towards apex of antennae; the longer hairs predominantly or entirely forward-pointing. the posterior face of the joints with only shorter hairs. Hind tibiae of viviparae without pseudosensoria. (*Eichochaitophorus* Essig, sensu Börner (1952)).

3 (4) Apterae with the longer antennal hairs and many of the dorsal body hairs blunt, truncate or furcate. Hairs on ant. III 4–9 in number, those of apterae not longer than about one and a half times the articular diameter of the joint. Alatae with marginal sclerites of abdomen hardly pigmented, much paler than the transverse spinal bars of the abdominal tergites. On *Populus alba*, *P. canescens* and *P. canescens* × *tremula* . . **albus** Mordvilko (*populi-albae* (B. de F.) *partim* (apt.), non Theobald, non Börner.)

4 (3) Antennal and dorsal body hairs all acute. Hairs on ant. III 8–18 in number, those of apterae longer than one and a half times articular diameter of joint. Alatae with marginal sclerites and spinal abdominal bars equally pigmented.

5 (6) Apical rostral joint with 3–5 (typically 4) secondary hairs. Summer apterae solidly black on dorsum, or slightly pale on mid-dorsum only. On *Populus tremula*. . . . . **tremulae** Koch

6 (5) Apical rostral joint with 6–8 hairs apart from the 3 primary pairs. Summer apterae with varying amounts of dark pigmentation distributed in two longitudinal lines running forward from the siphunculi, but never solidly black. On *Populus nigra*, *P. italica* and *P. canadensis* . . . . . **versicolor** Koch (*leucomelas* Koch)

The synonymy of *Chaitophorus albus* with *Aphis populi-albae* B. de F. can only be supported by the description of the apterae of the latter; the alatae of Fonscolombe's species must be those of *populeti* Panzer, since they are described as having totally black hind legs. Following this description Theobald (1929) has synonymised *populi-albae* with what he calls *populi* L. (*populeti* Panzer), while Börner (1952) puts *populi-albae* as a distinct species in *Chaitophorus* s. str., the grounds for this action not being clear. Since types of Fonscolombe's aphids do not exist it is only possible to restrict the name *populi-albae* by the application of page priority, in which case *albus* Mordvilko

will fall as a synonym. Owing to the existence of the incorrect applications of *populi-albae* referred to above I have used the name *albus* in the interests of clarity. *Chaitophorus inconspicuus* Theobald, described from Egypt, is also a synonym of *albus* Mordv.

Measurements of specimens (Cambridge, 12–15.vi.54):

Apterous viviparous female: Body 1·72 mm., antennal flagellum 0·90 mm., joint ratios (III–VI) 31 : 18 : 13 : 10 + 29, cauda 0·09 mm., apical rostral joint 0·14 mm., second joint of hind tarsus 0·13 mm., hairs on ant. III 4 and 6, their maximal length 28 μ, hairs on eighth tergite 7, articular diameter of ant. III 28 μ.

Alate viviparous female: Body 2·37 mm., antennal flagellum 1·21 mm., joint ratios (III–VI) 47 : 26 : 22 : 12 + 29, cauda 0·12 mm., apical rostral joint 0·15 mm., second joint of hind tarsus 0·15 mm., hairs on ant. III 7 and 9, their maximal length 40 μ, articular diameter of ant. III 26 μ, hairs on eighth tergite 8, secondary rhinaria on ant. III 23 and 25, on IV 5 and 3, on V 1 and 2.

30. *Chaitophorus niger* Mordvilko, 1929.

Eastop (1956*b*) gives records of this species (as *C. nigra*), confirmed by Hille Ris Lambers, from Cambridge. The hosts listed are *Salix purpurea*, *S. amygdalina* and *S. laurina*, to which may be added *S. babylonica*, Cambridge, 9.x.50, 12.xi.50 and 28.vi.51 (*H. L. G. S.* leg.). I am indebted to Dr. Hille Ris Lambers for the information that this species is the same as *Pseudomicrella jacobi* Börner, 1950. Its host range is similar to that of the next species (*C. truncatus* (Hausm.)), from which, however, it is distinguishable by a number of characters (*see below*).

Measurements of specimens:

Apterous viviparous female: (Cambridge, 28.vi.51): Body 1·84 mm., interantennal width of frons 0·21 mm., antennal flagellum 0·87 mm., flagellar joint ratios 26 : 16 : 15 : 12 + 28, hairs on ant. III 11 and 11, maximal hair length on ant. III 0·116 mm., articular diameter of joint 25 μ, apical rostral joint 0·12 mm., second joint of hind tarsus 0·13 mm., eighth tergite with 16 hairs in a double transverse row.

Apterous male (Cambridge, 11.x.50): Body 1·55 mm., interantennal width 0·22 mm., ant. flagellum 1·25 mm., flagellar joint ratios 44 : 31 : 21 : 11 + 33, hairs on III 12 and 11, maximal hair length on III 0·100 mm., articular diam. of joint 24 μ, apical rostral joint 0·12 mm., second joint of hind tarsus 0·12 mm., eighth tergite with 14 hairs in a double row, secondary rhinaria on III 20 and 18, on IV 18 and 20, on V 11 and 11.

Oviparous female (Cambridge, 11.x.50): Body 2·03 mm., interantennal width 0·24 mm., antennal flagellum 0·93 mm., flagellar joint ratios 25 : 19 : 17 : 12 + 31, hairs on III 8 and 10, maximal hair length on III 0·124 mm., articular diam. of III 28 μ, apical rostral joint 0·12 mm., second joint of hind tarsus 0·14 mm., eighth tergite with 32 hairs in a double and partially triple row, pseudosensoria on hind tibiae 138 and 123 (approximate count).

31. *Chaitophorus truncatus* (Hausmann, 1802).

Eastop (1956*b*) also lists this species as an addition to the British fauna on the basis of records from Cambridge; he records *Salix triandra* and *S. purpurea* as hosts, to which may be added another host and county record, viz. *Salix babylonica*, Herts.: Harpenden, 4.viii.55 and 18.x.56 (*H. L. G. S.* leg.).

Dr. Hille Ris Lambers (*in litt.*) has pointed out that there is some slight ground for doubt as to the applicability of the name *truncatus* Hausmann,

since his description (quoted by Kaltenbach, 1843) refers to the host as "Wollweide". This, on a strictly literal interpretation, should mean *Salix lanata*, a willow which does not occur in the area from which *truncatus* was described. In other respects the description, which was drawn up from late summer material, fits well with the present species.

The three recorded British species of *Chaitophorus* living on *Salix* may be separated by the following short key to apterous viviparae:

1 Apical rostral joint a little longer than second hind tarsal joint. On *Salix caprea* and related species of sallow . . . . . **salicti** Schrank
– Apical rostral joint a little shorter than second hind tarsal joint, or at most equal to it in length. On various members of the genus *Salix* section *Vitisalix*, e.g. *babylonica*, *amygdalina*, *laurina* and *triandra*; also on *S. purpurea* 2
2 Longest hairs on ant. III more than four times articular diameter of joint. (Apterae always blackish on dorsum. First tarsal joints with 2–3 subapical hairs in addition to the apical group of 2 long and 1 short). . . . . **niger** Mordv.
– Hairs on ant. III not more than four times articular diameter of joint. (Apterae pale in early summer, sometimes smoky brown on dorsum or partially so in late summer or autumn. First tarsal joints with typically 4 subapical hairs, rarely with only 3, in addition to the apical group.) . . . . . **truncatus** Hausm.

The sexual forms of *C. truncatus* and *C. niger* may be distinguished by the following characters:

Apterous males: The secondary rhinarial ranges of the two species in material seen to date (11 *truncatus* from four samples, seven *niger* from one sample) are:

	Antennal joints.		
	III.	IV.	V.
niger . .	18–24 Mean 20·21	16–22 Mean 19·29	10–15 Mean 11·62
truncatus .	8–20 Mean 14·14	4–13 Mean 9·59	3–8 Mean 5·27

Oviparous females: These may be keyed as follows:

Head, pronotum, legs and a band across abd. 8 blackish. Cauda distinctly knobbed due to a constriction at just past half its length . . **niger** Mordv.
Eighth tergite with barely a trace of dark pigmentation (and head and pronotum at most smoky). Cauda broadly rounded or with only a trace of constriction not resulting in a distinct knob . . . . **truncatus** Hausm.

Measurements of specimens of *C. truncatus*:

Apterous viviparous female: (Cambridge, 4.vi.54): Body 1·92 mm., interantennal width of frons 0·22 mm., antennal flagellum 1·02 mm., flagellar joint ratios 32 : 19 : 18 : 14 + 31, hairs on ant. III 5 and 5, maximal hair length on ant. III 68 μ, articular diameter of joint 32 μ, apical rostral joint 0·12 mm., second joint of hind tarsus 0·13 mm., eighth tergite with 11 hairs in a partially double transverse row.

Apterous male (Cambridge, 12.x.50): Body 1·59 mm., interantennal width 0·21 mm., antennal flagellum 1·38 mm., flagellar joint ratios 44 : 28 : 26 : 13 + 44, hairs on III 9 and

10, maximal hair length on III 0·100 mm., articular diameter of joint 25 μ, apical rostral joint 0·09 mm., second joint of hind tarsus 0·14 mm., eighth tergite with 11 hairs in a partially double row, secondary rhinaria on III 19 and 18, on IV 7 and 9, on V 6 and 6.

Oviparous female (Cambridge, 21.x.50): Body 2·33 mm., interantennal width 0·23 mm., antennal flagellum 1·07 mm., flagellar joint ratios 32 : 20 : 20 : 14 — 34, hairs on III 6 and 7, maximal hair length on III 0·110 mm., articular diam. of III 27 μ, apical rostral joint 0·11 mm., second joint of hind tarsus 0·14 mm., eighth tergite with 27 hairs in a double row, pseudosensoria on hind tibiae 125 and 115 (approximate count).

32. *Kallistaphis betulicola* (Kaltenbach, 1843). (Fig. 5, D–H).

Colour Notes.

Pale green, nude. Alatae with siphunculi rather strongly blackened, and with the apices of the antennal joints, and a broad zone on III bearing the secondary rhinaria, also blackish. Wing veins somewhat blackish bordered, especially second cubital. Apterae with siphunculi and antennae less noticeably darkened, very similar in life to those of *K. basalis* nom. nov.

Morphology.

Apterous viviparous female: Body elongate spindle-shaped, usually a little smaller than in apterae of *K. basalis* nom. nov. (observed range 2·05–2·32 mm., against 1·89–2·68 mm. in *basalis* nom. nov.). *Antennae* somewhat longer than in *K. basalis*, flagellum 1·26–1·46 times body length, mean 1·35, standard deviation 0·08, in *K. basalis* 0·95–1·30 times body length, mean 1·07, standard deviation 0·08. Joint III with 6–14 secondary rhinaria (2–10 in *K. basalis*); the position of the most basally situated rhinarium, expressed as the percentage of the total length of the third joint, and measuring from the articulation to the proximal margin of the basal rhinarium, ranges from 21 to 35 (mean 26, standard deviation 4), while in *K. basalis* the same character gives values varying from 5 to 11 per cent., mean 8, standard deviation 2. *Rostrum* with apical joint 0·15–0·17 mm. long, against 0·13–0·15 mm. in *K. basalis*. *Siphunculi* frequently but not always dusky pigmented towards apex. Other characters as in apterae of *K. basalis*.

Measurements of specimens:

Body.	Ant.	Joint ratios (III–VI).	rhin. III.	A.j.r. rost.	2.h.t.	Hairs a.j.r.	Position of prox. rhin.
2·18	2·86	113 : 78 : 72 : 30+64	9/8	0·15	0·13	6	28 & 21
2·26	2·85	118 : 74 : 72 : 30+62	9/7	0·16	0·14	8	27 & 30
2·15	2·73	108 : 74 : 68 : 30+61	8/7	0·16	0·13	3	26
2·28	2·98	111 : 83 : 78 : 36+64	11/9	0·16	0·14	6	26
2·05	2·85	98 : 81 : 76 : 33+68	6/6	0·17	0·14	7 ?	35
2·32	?	130 : 82 : — : —	13/11	0·16	0·14	5 ?	22
2·11	3·04	116 : 82 : 82 : 32+68	8/8	0·15	0·13	7	24
2·21	3·22	122 : 91 : 84 : 36+70	9/14	0·17	0·14	5	25

All specimens from *Betula*, Rowardennan, Stirlingshire: Nos. 1 and 2, 8.vii.53 (*H. L. G. S.*); 3–8.vii.1954 (*A. R. Hill*). All length measurements in mm. Antennae measured without joints I and II.

Alate viviparous female: In general very similar to alatae of *K. basalis*, but more strongly pigmented. *Antennal flagellum* 1·27–1·66 times as long as body, mean of 5 specimens 1·46, standard deviation 0·15 (in *K. basalis* flagellum 1·06–1·35 times as long as body, mean of 12 specimens 1·17, standard deviation 0·08). Joint III with 10–18 secondary rhinaria in a single row, situated on a more or less well defined darkly pigmented zone, and with distance between joint articulation and proximal margin of most basally situated rhinarium ranging from 13 to 24 per cent. of the length of the joint, with mean 17, standard

deviation 3 (in *K. basalis* this character ranges from 5 to 11 per cent., mean 8, standard deviation 2). *Siphunculi* with apical half strongly blackish pigmented (entirely pale in *K. basalis*). *Wings* with on the average more heavily shaded veins than the alatae of *K. basalis*. Other characters as in *K. basalis* nom. nov.

Measurements of specimens :

Body.	Ant.	Joint ratios (III–VI).	Sec. Rhin.	A.j.r.	2.h.t.	Hairs a.j.r.	Position of prox. rhin.
2·06	2·92	110 : 83 : 74 : 30+68	16/12	0·16	.	6	20 & 24
2·60	4·20	151 : 113 : 112 : 40+86	16/18	0·16	.	3 ?	14 & 17
2·27	3·20	115 : 90 : 86 : 37+72	12/12	0·15	0·14	.	17 & 19
2·27	2·89	118 : 80 : 74 : 30+59	13/13	0·14	0·13	.	15 & 19
1·74	2·89	116 : 82 : 76 : 29+58	10/11	0·14	0·13	.	14 & 17

Specimen no. 1 from *Betula*, Rowardennan, Stirlingshire, July, 1954 (*A. R. Hill*); 2, from sticky trap, East Malling, Kent, 1952 (*J. T. Legg*); 3–5, from yellow traps, Netherlands (*D. Hille Ris Lambers*). All length measurements in mm. Antennae measured without joints I and II.

Biology.—The biology of *Kallistaphis betulicola* (Kltb.) is apparently similar to that of *K. basalis*, with which it occurred in the locality at Dubh Lochan, Rowardennan. The host is *Betula*, but it is not yet known whether the species is confined to one species of birch. Dr. Hille Ris Lambers (*in litt.*) has told me that he noted differences of the kind quoted here as diagnostic for *basalis* and *betulicola* between material collected from *B. verrucosa* and *B. pubescens*. However, he later came to the conclusion that the distinctions did not hold very well, which suggests that his material from the two hosts may have been composite. It is possible that a similar state of affairs prevails to that obtaining in the case of *Brachycaudus lychnidis* (L.) and *B. klugkisti* (Börner), the former of which appears to prefer *Melandryum album* and the latter *M. rubrum* as host, but which are apparently capable of cross-infesting one another's preferred hosts.

Taxonomy.—Diagnosis of *betulicola* is easily made on the basis of the rhinarial distribution on the third antennal joint in both apterae and alatae. Pigmentation characters, though striking in their most extreme form, are less reliable for separating the species from *K. basalis*. The rather longer antennae seem to be nearly an exclusive character, but the ratio of flagellum to body length is liable to fluctuate allometrically, and in view of the generally somewhat smaller size of *K. betulicola* should perhaps be regarded with reserve.

Börner (1952) places *Calaphis flava* Mordvilko in *Kallistaphis*, though with some doubt. I do not know this species, but would suppose the doubt expressed by Börner to be justified, since *C. flava* has no summer apterous forms, a character at once distinguishing it from *Kallistaphis betulicola* and *K. basalis*.

Quednau (1954) makes *Kallistaphis* Kirkaldy a synonym of *Calaphis* Walsh, type *C. betulella* Walsh, and erects the new genus *Procalaphis* for *Calaphis* sensu Börner, 1952. I am not at present satisfied that the European *betulicola* and the North American *betulella* are congeneric, and I therefore retain here the use of Kirkaldy's genus, the type fixation of which makes its applicability certain.

Material examined.—Apterous viviparous females : 8 from Rowardennan, Stirling ; 1 from Hell Coppice, Buckingham. *Alate viviparous females* :

1 from Rowardennan; 1 from Hell Coppice; and trapped specimens from East Malling, KENT (WEST); Appleby, WESTMORLAND; Brampton, CUMBERLAND (3); and the Netherlands (3). The British records represent the present known range in this country, except that Dr. V. F. Eastop has informed me of a single aptera of *betulicola* in the Buckton collection at the British Museum (Natural History); apart from this specimen all the material of "*betulicola*" in the Museum collections belong to the next species, *K. basalis* nom. nov.

32*a*. **Kallistaphis basalis,** nom. nov. (Fig. 5, A–C, J, K).

Therioaphis betulicola Kltb., Theob., 1927, nec Kltb., 1843.

This name is proposed for the aphid described by Theobald (1927) as *Therioaphis betulicola* (Kltb.). Kaltenbach's original description refers to a species with black siphunculi, and with the antennae in apterae much longer than the body, and the wing veins in alatae strongly darkened. The common species on birch in Europe is entirely pale green except for the apices of the antennal joints and tibiae and the tarsi; and the apterae have the antennal flagellum as a rule not much longer than the body, while the alatae have the wing veins not very obviously darkened.[3] The true *K. betulicola* (Kltb.) has recently been identified from material collected in Stirlingshire and alatae trapped in Kent. It appears to be much rarer than *K. basalis*, and is discussed above as an addition to the British fauna.

The new name *basalis* given to Theobald's species refers to the characteristic distribution of the secondary rhinaria on the third antennal joint, which is the most reliable character for separating the species from *K. betulicola* (Kltb.).

Note.—I have elsewhere (Stroyan, 1950 : 119–20) discussed and rejected as undesirable and unjustifiable the practice of treating as valid specific names fortuitously produced by a misidentification, with simultaneous removal to another genus from that of the original species misidentified. The recent Paris and Copenhagen decisions of the International Commission uphold this point of view. Therefore *Callipterus betularius* of Buckton, 1879, but not of Kaltenbach, 1843, is excluded as a prior name for the species here discussed.

33. *Myzocallis schreiberi* Hille Ris Lambers and Stroyan (nom. nud.).

The description of this species, from material collected by the joint authors in Italy and by the present writer in England, will appear shortly. The host is *Quercus ilex*, where it lives on the underside of the leaves. Sexuales are apparently not produced, and alatae have been collected in the middle of winter.

The known British distribution is: EAST CORNWALL: Fowey, 11–13.ix.55; SOUTH DEVON: Exeter, 19.x.55; BEDFORD: Silsoe, 29.ix.55, 14.xi.55, 27.i.56 (*H. L. G. S.*). It will probably prove to be more widespread where its host tree is planted, though the distribution is likely to be limited by climatic factors. The species is always sparse and easily overlooked.

[3] Occasional alatae of *basalis* have dusky apices to the siphunculi; but the other characters described by Kaltenbach for *betulicola*, together with the prevalence of pale siphunculi in *basalis* n. n., point rather definitely towards the conclusion arrived at here on the identities of the two species.

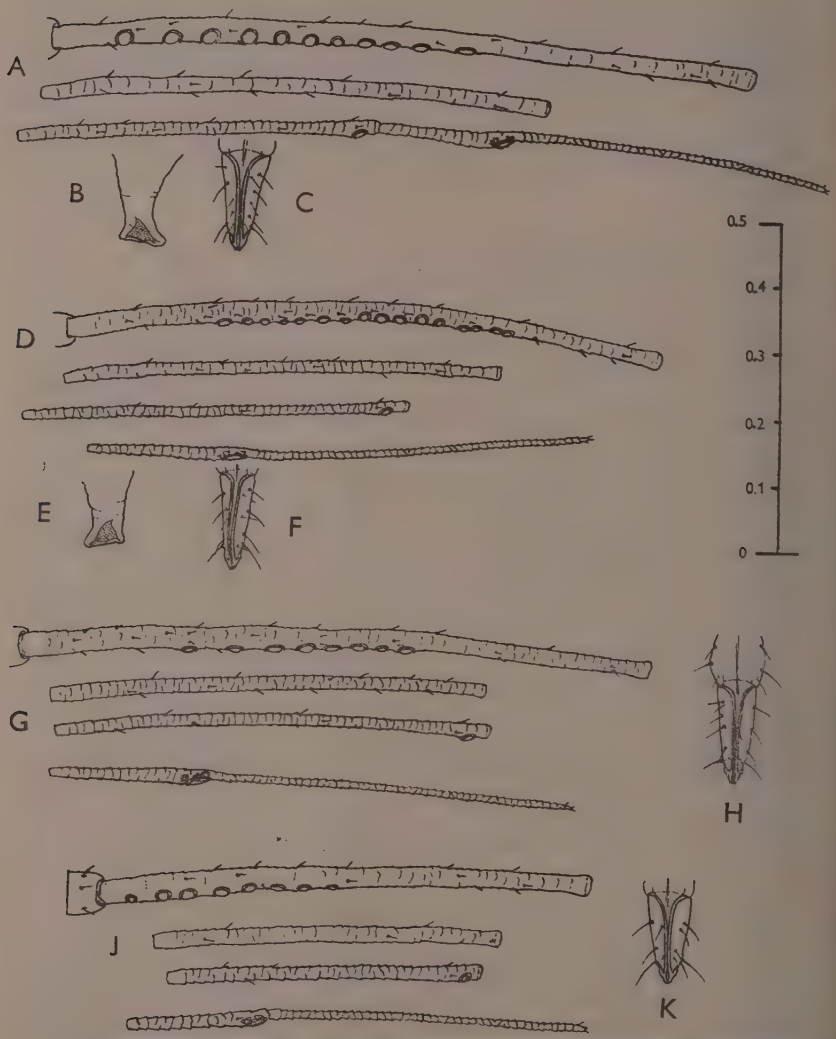

FIG. 5.—*Kallistaphis basalis*, nom. nov.: al. viv. ♀, A antennal flagellum, B siphunculus, C apex of rostrum; apt. viv. ♀, J antennal flagellum, K apex of rostrum. *Kallistaphis betulicola* (Kltb.): al. viv. ♀, D antennal flagellum, E siphunculus, F apex of rostrum; apt. viv. ♀, G antennal flagellum, H apex of rostrum.

34. **Myzocallis börneri** nom. nov.

This name is proposed for *Myzocallis pictus* (Ferrari) of Börner, 1952, and Quednau, 1954, non Ferrari, 1872. The true *Pterocallis pictus* Ferrari evidently preoccupies *Myzocallis boudyi* Mimeur, 1934 (non-British). The present

species lives under the leaves of *Quercus cerris*, *Q. suber* and *Q.* × *lucombeana* (*cerris* × *suber*) over the whole of western and central Europe, and has been taken also (introduced with cork oak ?) in the United States. A fuller account of the species will shortly be published elsewhere.

The British records to hand at present are : South Devon : Exeter, Starcross, Powderham, 18–19.x.55 ; Surrey : West Byfleet, 7.ix.55 ; Hertford : Harpenden, 25.x.55, 20–23.v.56 ; Bedford : Silsoe, 14.xi.55 (*H. L. G. S.*). It will almost certainly prove to be much more widespread.

35. *Therioaphis luteola* (Börner, 1949).

This species was set by Börner (1949) as the type of his genus *Triphyllaphis*, first published as a *nomen nudem* in 1944. The principal character upon which Börner separated *Triphyllaphis* from other members of the *Therioaphis* group is the presence of pleural hairs in all instars, all other genera included in the group by Börner being without pleural hairs at least in the first instar. However, Quednau (1954) decided upon other grounds to place *Therioaphis subalba* Börner with *luteola* in the genus *Triphyllaphis*, and thus reduced the value of the pleural hairs from that of a generic character to that of a specific one. While his action appears reasonable it is hard to understand why he did not proceed from it to the conclusion that the genera *Pterocallidium* Börner and *Triphyllaphis* Börner are not really worthy of full generic separation from *Therioaphis* Wlk., a point of view which is adopted here.

T. luteola (Börner) is at present known as British from records of alatae trapped or swept from red clover in the counties of Hertford and Bedford. The data for the four available specimens are : (1) Trapped, Harpenden, HT, 14.vii.47 ; (2) and (3) trapped, Cardington, BD, 23 and 28.vii.47 (*V. F. Eastop* leg.) ; (4) swept from *Trifolium pratense*, Chalton, BD, viii.55 (*A. H. Strickland* leg.). I am indebted to Messrs. J. P. Doncaster and A. H. Strickland for the opportunity to examine the specimens. From them the following morphological notes have been made.

Alate viviparous female : Antennal flagellum from about three-quarters to nine-tenths as long as body ; *processus terminalis* subequal to base of VI, the whole joint being just shorter than IV ; joint III with 14–18 secondary rhinaria along most of its length in a single row, the distance to the distal margin of the last rhinarium varying from 82 to 92 per cent. of the total length of the joint (in *Therioaphis ononidis* (Kltb.) the equivalent range is from 47 to 82 per cent., in *T. trifolii* (Monell) from 43 to 71 per cent. and in *Myzocallidium riehmi* Börner from 41 to 55 per cent.; figures for alatae of *Th. subalba* Börner are not available). *Spinal* and *pleural abdominal hairs* arranged singly on regularly situated and uniformly sized small conical sclerites which are rather well pigmented ; the hairs themselves are rod-like, capitate and of very variable length (ranging from about 32 μ to 92 μ on the third tergite, and from 36 μ to 84 μ on the eighth). Those of the seventh tergite (spinals) are displaced laterally. The eighth tergite bears a pair of spinal hairs on closely approximated sclerites, but the marginal hairs are apparently suppressed in all four specimens seen ; in *Therioaphis ononidis* and *Therioaphis trifolii* a pair of capitate hairs occurs marginally as well as the spinal pair. *Embryones* inside body cavity with pleural hairs clearly visible in cleared specimens ; this can be used as a diagnostic character for identifying specimens of *T. luteola*. The identification can be confirmed from a study of the secondary rhinarial distribution on ant. III, by the uniform size and regular arrangement of the abdominal sclerites and by the number of hairs on the eighth tergite.

Measurements of one specimen :

Alate viviparous female : Body 2·09 mm., interantennal width of frons 0·16 mm., antennal flagellum 1·80 mm., flagellar joint ratios 74 : 44 : 41 : 21 + 22, siphunculus 0·056 mm., cauda 0·244 mm., caudal hairs 2 long apical + 15 short, apical rostral joint 0·096 mm., second joint of hind tarsus 0·130 mm., secondary rhinaria on ant. III 18 and 18 (Chalton, viii.55).

36. *Ctenocallis setosus* (Kaltenbach, 1846). (Fig. 6).

This very distinctive small species was first found in this country in September, 1954, when ornamental broom bushes (*Sarothamnus scoparius*) were found rather heavily infested at West Byfleet, Surrey (*H. L. G. S.*).

The very inconspicuous yellowish apterae sit chiefly on the upperside of the leaflets, and to a lesser extent on the stems of broom. The fully mature aphids are less noticeable than the larvae, since the yellow ground colour of the dorsum is more or less obscured by brownish sclerotic segmental bars, which extend laterad from near the mid-line to the body margins. In the younger forms these bars are broken up, and the pleural regions of the segments are membranous.

The species is at once distinguished from all other British Callaphididae by the presence of complete segmental series of long, finger-like papillae on the spinal and marginal regions of the body segments. The marginal series is complete from the pronotum to the seventh abdominal tergite, with one papilla

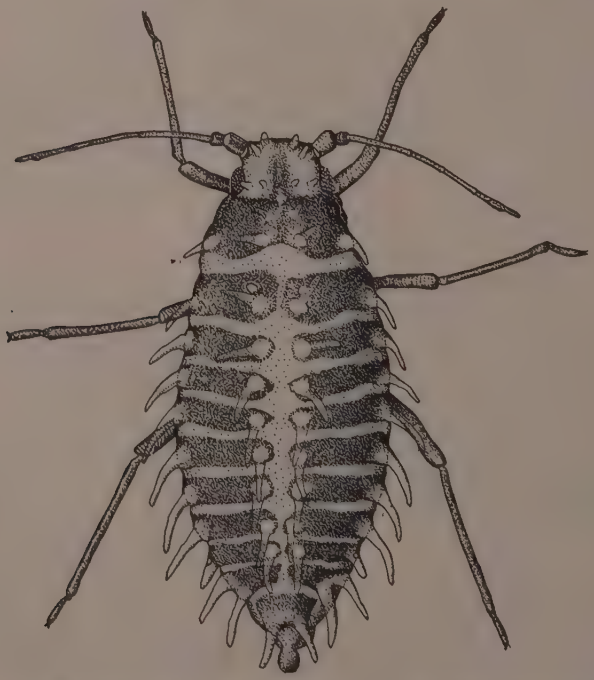

Fig. 6.—*Ctenocallis setosus* (Kltb.) : apt. viv. ♀ (after Hille Ris Lambers).

on each side per segment. That of the sixth abdominal segment is shorter than the rest and the siphuncular porus opens at its base anteriorly. The spinal series is complete from the head to the eighth abdominal segment inclusive. The head bears three median pairs of short ones in line astern from the frons to the vertex, and an additional lateral pair on the vertex. The mesonotum has its spinal papillae duplicated or sometimes triplicated anteroposteriorly, while all other segments have a single spinal pair. Those of the seventh abdominal tergites are shifted laterad and lie close to the marginal pair. The dorsal cuticle is strongly and irregularly rugose.

In the winged forms the papillae are much reduced in size, the siphuncular pori are more or less apical on short, blunt, spinulose processes, the wing membrane is rather densely and finely spinulose-imbricate, and the radial sector is absent, its mechanical function being performed by the strongly recurved first branch of the median. The males are alate. Oviparous females have rather strongly swollen hind tibiae, with fairly numerous but inconspicuous gland plates ("pseudosensoria") over the proximal three-quarters of their length.

Ctenocallis dobrovljanskyi Klodnitzki, a non-British species recorded from Russia by Mordvilko and Klodnitzki and from Styria (as *Oniscomyzus bramstedti* Börner) by Börner (1942), is recorded from *Cytisus pilosus* and *C. biflorus*. It differs from *C. setosus* in the absence of the spinal series of dorsal papillae. The synonymy of *dobrovljanskyi* and *bramstedti* is due to Quednau (1954). I am not in a position to comment on it.

Measurements of specimens of *C. setosus* (Kltb.):

Apterous viviparous female: Body 1·52 mm., antennal flagellum 0·54 mm., joint ratios (III–VI) 23 : 9 : 14 : 14 + 7, secondary rhinaria on III 3 and 3, cauda 0·14 mm., apical joint of rostrum 0·08 mm., second joint of hind tarsus 0·10 mm. Length of papillae on head 0·03–0·04 mm., lengths of papillae on abdominal segments as under:

	Segment.								
	1.	2.	3.	4.	5.	6.	7.	8.	
Spinal . .	0·13	0·15	0·16	0·15	0·16	0·16	0·18	0·18	(mm.)
Marginal .	0·14	0·15	0·14	0·16	0·15	0·06	0·14	None	,,

Alate male: Body 1·09 mm., antennal flagellum 0·78 mm., joint ratios (III–VI) 38 : 17 : 17 : 17 + 9, secondary rhinaria on III 9 and 9, on IV 1 and 1, on V 1 and 0, on basal part of VI 1 and 1, cauda 0·10 mm., apical joint of rostrum 0·07 mm., second joint of hind tarsus 0·10 mm.

Oviparous female: Body 1·56 mm., antennal flagellum 0·50 mm., joint ratios (III–VI) 23 : 8 : 13 : 13 + 6, secondary rhinaria on III 1 and 2, cauda 0·14 mm., apical joint of rostrum 0·09 mm., second joint of hind tarsus 0·10 mm. Length of head papillae 0·02 to 0·04 mm., lengths of papillae on abdominal segments as under:

	Segment.								
	1.	2.	3.	4.	5.	6.	7.	8.	
Spinal . .	0·14	0·14	0·14	0·15	0·15	0·13	0·17	0·14	(mm.)
Marginal .	0·12	0·14	0·14	0·14	0·14	0·04	0·12	None	,,

Apt. viv. and ovip. females from West Byfleet, Surrey, 5.ix.54 (*H. L. G. S.*); male from Bennekom, Netherlands, August, 1949 (*D. Hille Ris Lambers*).

37. *Cinara schimitscheki* Börner, 1940.

The original description (Börner, 1940) when translated reads: " Dark brown, dorsal hairs of apterae in contrast to (those of) *C. pini* L. very short, recumbent. 4–5 mm., Twig apices of *Pinus austriaca* ".

A single aptera referable to this species, and confirmed by Dr. Hille Ris Lambers, was taken from *Pinus nigra* var. *calabrica* in the University Botanic Gardens, Cambridge, on 9th October, 1950 (*H. L. G. S.*). The recumbent hairs of this specimen are very well marked; those lying near the body margins can be seen to bend sharply posterad near their bases. The measurements of this specimen are given below.

Apterous viviparous female (*Pinus nigra*, Cambridge, 9.x.50): Body 4·41 mm., interantennal width 0·54 mm., antennal flagellum 1·45 mm., joint ratios (III–VI) 76 : 30 : 33 : 17 + 6, maximal diameter of siphuncular cone 0·75 mm., cauda 0·22 mm., apical joint of rostrum (total of both subsegments) 0·48 mm., second joint of hind tarsus 0·36 mm., secondary rhinaria on ant. III 0 and 0, on IV 0 and ?, on V 1 and ? 1, hairs on eighth tergite about 42, maximal hair length on ant. III 92 μ, articular diameter of ant. III 40 μ, hairs on third abdominal tergite up to 80 μ, on eighth tergite up to 120 μ in length.

38. *Cinara* (*Laricaria*) *kochiana* (Börner, 1939).

The name *kochiana* was given by Börner (1939) to his interpretation of *Lachnus laricis* Koch, 1856, non *Aphis laricis* Wlk., 1848, the former being a secondary homonym of the latter. According to Hille Ris Lambers (1955) Börner's interpretation of *laricis* Koch is incorrect, but the name is valid since he gave an indication making the identity of *kochiana* clear. To quote from Hille Ris Lambers " *C. kochiana* Börner is a tar-brown, very large, elongated species with black or blackish tibiae ". Börner's diagnosis says: " The ventral mesothoracic tubercle is adorned with some hairs in this very large species, in other respects it agrees generically with the species of the genus (*Cinaria* Börner, 1939, non Baker, 1920, errore pro *Cinara* Curtis) named in paragraph 2 " (*tr. H. L. G. S.*). According to Hille Ris Lambers the true *laricis* Koch is probably the same as *laricicola* Börner, 1939, which is however preoccupied; he proposes the new name *C. börneri* for *laricicola* Börner non Matsumura, 1917 (recorded as British by the present author in a previous paper (Stroyan, 1955)).

C. kochiana has not hitherto been recorded as British. Two specimens, an alate and an apterous viviparous female, were taken from roots of *Larix decidua* in the New Forest, Hants., on 2nd October, 1955 (*A. J. Pontin*), and were submitted to the writer for determination by Mr. A. F. G. Dixon. The measurements of these specimens are given below.

Apterous viviparous female (*Larix decidua*, New Forest, 2.x.55): Body 6·20 mm., interantennal width 0·54 mm., antennal flagellum 2·40 mm., joint ratios (III–VI) 116 : 58 : 64 : 21 + 10, max. diameter of siphuncular cone 0·63 mm., caudal length 0·26 mm., apical joint of rostrum (total of both subsegments) 0·55 mm., second joint of hind tarsus 0·45 mm., secondary rhinaria on ant. III 5 and 6, on IV 3 and 3, on V 2 and 2, hairs on eighth tergite about 60, max. hair length on ant. III up to 37 μ, on third abd. tergite to 20 μ, on eighth tergite to 112 μ.

Alate viviparous female (data as above): Body 5·68 mm., interantennal width 0·48 mm., antennal flagellum 2·38 mm., joint ratios (III–VI) 116 : 58 : 64 : 20 + 9, max. diam. siph. cone 0·55 mm., cauda 0·29 mm., apical joint of rostrum 0·52 mm., second jt. hind tarsus 0·46 mm., secondary rhinaria on ant. III 12 and 12, on IV 2 and 4, on V 3 and 2, hairs on eighth tergite about 60, max. hair length on ant. III and abd. 3T 60 μ, on abd. 8T to 100 μ.

Postscript.—I am indebted to Mr. J. P. Doncaster for the following additional information about the British status of *kochiana*. Walker (1848) described oviparae of *laricis* which are in fact *kochiana*, and his collection in the British Museum (Nat. Hist.) and the Hope Department, Oxford, contains oviparae collected from larch at Southgate, MIDDLESEX, on 16.x.1847. There is also in the British Museum collections a sample of apterae and alatae from DEVON, 8.vi.37 (*L. N. Staniland* leg.).

39. *Cinara* (*Cinaropsis*) *bogdanowi* (Mordvilko, 1894).

This species was originally described by Mordvilko (1894) from the branches of spruce. Later Wellenstein (1930) described a species *Dilachnus radicicolus* from spruce roots. Both species were described principally from sexuales. Pašek (1952) listed both species from Czechoslovakia. Börner (1952) placed both as synonyms of *Lachnus pruinosus* Hartig, 1841, a synonymy which as regards *bogdanowi* had already been suggested by Braun (1938). Pašek (1953) accepted the synonymy of *bogdanowi* and *pruinosus* without comment; the same author (1954) later agreed with the synonymy of *bogdanowi* and *radicicolus*, but placed *pruinosus* as a doubtful synonym.

The available material and the descriptions of the various forms involved in this question are scanty. Through the kind co-operation of Mr. J. P. Doncaster I have been able to examine the material in the possession of the British Museum (Natural History), which consists of oviparae and a male nymph of *bogdanowi* from Mordvilko's own material, and four apterae and one mature ovipara collected by Pašek in Czechoslovakia, and determined by him as *radicicolus*. Apart from this material I have seen one aptera collected by Mr. Doncaster from *Picea schrenkiana* at the R.H.S. Gardens, Wisley, SURREY, on 6.vi.53, and I possess one aptera and one alata collected from *Picea* near Bennekom, Netherlands, in June, 1949. I have also collated the descriptions of *pruinosus* (Hartig, 1841), *bogdanowi* (Mordvilko, 1894; Cholodkovsky, 1898) and *radicicolus* (Wellenstein, 1930). The relevant facts appear to be as follows:

The description of *Lachnus pruinosus* is not accompanied by a host indication, and appears to be equally open to interpretation as an alata of *Cinara laricis* (Wlk.). The reference to " weissen Wollbüscheln " on the abdominal dorsum suggests a tessellated appearance such as is typical of *laricis*, while such a feature is not mentioned in the descriptions of *bogdanowi*. In view of this ambiguity the substitution of *pruinosus* for *bogdanowi* is inadvisable.

Lachnus bogdanowi was described from the aerial parts of spruce and *Dilachnus radicicolus* from the roots. Pašek took comparable material from both branches and roots of spruce, so that the biological distinction between the two is not valid. Such details of morphology as can be gleaned from the original descriptions of oviparae (relative lengths of antennal joints, wax band behind the siphunculi, chaetotaxy) show no obvious differences. The

colour descriptions differ somewhat, however, since Mordvilko refers to paired cinnamon-brown patches on the meso- and metathorax and to two narrow *transverse* black bands on the first abdominal segment reaching to the side margins; while Wellenstein speaks of two broad dark brown to greenish bands running *along* the back towards the siphunculi. Cholodkovsky (1898), however, supplements Mordvilko's description by giving particulars of the apterae of *bogdanowi*, and his description refers to broad, intersegmentally interrupted longitudinal brown bands similar to those described by Wellenstein for oviparae of *radicicolus*.

Examination of the available material reveals no differences on which it seems practicable to base two separate species. The principal characters of all the specimens seen are those characterising Börner's subdivision *Pityaria* of *Cinaropsis*, which is used by him (1949, 1952) as a subgenus: the apical rostral joint (both parts together) is longer than the two joints of the hind tarsus together, and the first joint of the latter has its dorsal length greater than its basal width. A further character in which *bogdanowi* differs from the spruce-living species of *Cinaropsis* sensu stricto (Börner, 1952) is in the very large and conspicuous siphuncular cones, which have a maximum diameter of from 0·30 to 0·71 mm. in the specimens seen, while those of *Cinaropsis* s. str. are small and inconspicuous. *Lachniella costata* (Zetterstedt) exhibits the same large siphunculi, but the apterae may be readily distinguished from those of *bogdanowi* by the much longer tibial hairs (up to 0·2 mm. long, against not more than about 0·1 mm. in *bogdanowi*), by the sixth antennal joint being about equal to the fifth (distinctly shorter in *bogdanowi*) and by the relatively shorter dorsal length of the first joint of the hind tarsus, which is not more than about one-eighth as long as that of the second joint, as against about one-fifth to one-quarter in *bogdanowi*. Alatae are readily distinguished from those of the present species by the single fork of the median vein and dark markings of the median and cubital areas in the fore-wing, which are characteristic of *Lachniella* but absent from *Cinara*.

The following short key will serve to separate the apterae of the Cinarine species so far recorded in Britain living on *Picea*:

1 (2) Antennal hairs very short, those on III not more than one and a half times the articular diameter of the joint. Tibial hairs similar. Very large species with extremely small siphuncular cones bearing only about two rings of hairs, and with ant. III about equal to IV–VI together . . . . . **Cinara piceae** (Panzer)

2 (1) Antennal hairs long and fine, those on III much more than three times the articular diameter of the joint. Tibial hairs similar. Medium-sized species with ant. III much shorter than IV–VI together.

3 (4) Siphuncular cones rather small (typically not more than 0·3 mm. in diameter with 3–4 rings of hairs) and less deeply pigmented than the rows of dorsal muscle sclerites (character well seen with a pocket-lens in mounted specimens). Second joint of hind tarsus distinctly longer than siphuncular diameter. **Cinara pilicornis** (Hartig)

4 (3) Siphuncular cones rather large (typically more than 0·3 mm. in maximum diameter), equally pigmented with the dorsal muscle sclerites. Second joint of hind tarsus distinctly shorter than siphuncular diameter.

5 (6) Hind tarsus with the dorsal lengths of joints I and II in the ratio of approximately 1 : 5 to 1 : 4. Ant. VI distinctly shorter than V. Tibial hairs maximally about 0·1 mm. long.
Cinara bogdanowi (Mordvilko)

6 (5) Hind tarsus with the dorsal lengths of joints I and II in the ratio of approximately 1 : 9 to 1 : 8. Ant. VI subequal to V. Tibial hairs up to 0·2 mm. long . . . . . **Lachniella costata** (Zett.)

The earliest British record of *C. bogdanowi* appears to be one of apterae taken by Walker at Southgate, MIDDLESEX, on 2.ix.1847 and 11.ix.1847, and now in the collection of the British Museum (Natural History). The slide is labelled with the host record "larch" and the name *laricis*, but I am told by Mr. Doncaster that the specimens fall clearly into *Pityaria*, and that Walker's material of *laricis* also includes a specimen of *Cinara piceae* (Pz.), so that the host record would seem to be open to some doubt. Apart from this the previously quoted record from Wisley, SURREY, completes the picture of *bogdanowi* as a British aphid.

Measurements of specimens :

Apterous viviparous female : (1) Body 3·77 mm., antennal flagellum 1·34 mm., joint ratios (III–VI) 122 : 64 : 68 : 37 + 9, max. diam. of siphunculus 0·71 mm., length of rostrum (joints II–IV) 2·18 mm., apical joint 0·272 + 0·120 mm., dorsal lengths of hind tarsal joints 0·060 + 0·280 mm., secondary rhinaria on III 0 and 0, on IV 2 and 2, on V 1 and 1 (Wisley, SR, 6.vi.53). (2) Body 3·20 mm., ant. flag. 1·17 mm., joint ratios (III–VI) 100 : 52 : 64 : 37 + 9, max. diam. of siphunculus 0·54 mm., length of rostrum (II–IV) 2·00 mm., apical joint 0·250 + 0·120 mm., dorsal lengths of hind tarsal joints 0·060 + 0·262 mm., sec. rhinaria on III 0 and 0, on IV 1 and 2, on V 1 and 1 (Bennekom, Netherlands, 21.vi.49).

Alate viviparous female : Body 3·93 mm., ant. flag. 1·56 mm., joint ratios (III–VI) 144 : 74 : 84 : 38 + 10, max. diam. of siphunculus 0·68 mm., length of rostrum (II–IV) 2·04 mm., apical joint 0·270 + 0·118 mm., dorsal lengths of hind tarsal joints 0·062 + 0·328 mm., sec. rhinaria on III 8 and 7, on IV 3 and 2, on V 1 and 1 (Bennekom, Netherlands, 21.vi.49).

Oviparous female : (1) Body 3·78 mm., ant. flag. 1·35 mm., joint ratios (III–VI) 138 : 58 : 62 : 37 + 7, max. diam. of siphunculus 0·55 mm., length of rostrum (II–IV) 1·91 mm., apical joint 0·260 + 0·120 mm., dorsal lengths of hind tarsal joints 0·060 + 0·296 mm., sec. rhinaria on III 0 and 0, on IV 1 and 1, on V 1 and 1 (Mordvilko specimen, without data). (2) Body 2·5 mm. (approx.), ant. flag. 1·06 mm., joint ratios (III–VI) 96 : 48 : 54 : 33 + 7, max. diam. of siphunculus 0·30 mm., length of rostrum (II–IV) 1·88 mm., apical joint 0·248 + 0·116 mm., dorsal lengths of hind tarsal joints 0·064 + 0·256 mm., sec. rhinaria on III 1 and 2, on IV 1 and 2, on V 1 and 1 (*Picea excelsa*, Ruske Peklany, Czechoslovakia, 3.x.50).

40. *Aloephagus myersi* Essig, 1950.

Eastop (1956*b*) has recently recorded the finding in the British Museum (Natural History) of material of this curious aphid taken by the late Mr. G. Fox-Wilson on *Aloë aristata* Haw., at East Croydon, SURREY, on 8.x.37. Diagnostic characters for its recognition are given. The status of *Aloephagus* in this country is clearly that of a casual introduction.

41. *Pemphigus* (*Pemphiginus*) *populi* Courchet, 1879.

A good modern description of this species is given by Roberti (1938). The subgenus *Pemphiginus* Börner differs from *Pemphigus* s. str. in the fact that

the spring migrant alatae are without siphuncular pores, and in this and other respects such as rhinarial distribution resemble the sexuparae of the main subgenus. The gall of *P. populi* Courchet is a small globular excrescence, later becoming somewhat lobed or elongate, on the upper surface of the leaf lamina of *Populus italica*, near the base of the lamina ; when ripe it opens by means of a secondary dehiscence at the top. The biology of the alienicolae is unknown. Dr. Hille Ris Lambers has suggested tentatively that some alate sexuparae collected by the writer crawling up the bole of a stunted *Sorbus* on open moorland at Smiddywellrigg, Northumberland, in October, 1955, might belong to *populi* Courchet. An attempt to transfer migrants to *Poa annua* in July, 1956, met with no success.

Galls of *P. populi* were collected in numbers from *Populus italica* in his garden at Harpenden, Herts., by Mr. J. P. Doncaster at the end of June, 1956, and he kindly gave living material to the writer for use in transference experiments, which as noted above were unsuccessful. Apart from this record from vice-county HERTFORD no information is available about the species in Britain.

IV. APPENDIX (A).

Since the publication of *Recent Additions to the British Aphid Fauna*, Part II (Stroyan, 1955), some additional information has become available about certain species discussed therein. This appendix contains notes on these species, together with certain synonymic data of importance for the British fauna.

4. *Macrosiphoniella ptarmicae* Hille Ris Lambers, 1956.

The description of this species appeared in Hille Ris Lambers (1956). It is closely related to *M. tanacetaria* (Kltb.), but differs from it in having longer hairs on the paler tibiae.

Secondary rhinaria in *apterae* over slightly less to a little more than the basal half of ant. III, in *alatae* over the whole of this joint. *Dorsal hairs* not on scleroites. *Colour* in life green, with marked whitish pulverulence. Living up the stems and in the capitula of *Achillea ptarmica*. Easily distinguishable from *M. millefolii* (De Geer), which also infests *Achillea ptarmica*, by the absence of dorsal scleroites bearing the dorsal hairs.

A second British record is given by Eastop (1956*b*), from the vice-county of WESTMORLAND : Barngate, 16.viii.55 (*J. P. Doncaster* leg.). (The locality actually lies within the administrative county of Lancashire, the northern part of which is reckoned with Westmorland for zoogeographical purposes).

8. *Nasonovia nigra* (Hille Ris Lambers, 1931).

Much further material of this species and the closely related *N. compositellae* (Theob.) was collected during 1954 and 1956. The known range of the latter now extends northwards to MIDLOTHIAN, north-westwards to Iceland (Hille Ris Lambers, 1955) and south-eastwards to DERBY. From Derbyshire to Mid-Wales the ranges of the two species overlap. In North Wales it appears that *compositellae* tends to occur at higher levels above sea level than *nigra*. The morphological relationship between the two forms is apparently of greater complexity than was suggested by Stroyan (1955). While the rhinarial distri-

bution and the length ratios of the third and sixth antennal joints on the whole retain their validity as discriminants (Stroyan, 1953), it seems likely that these characters are liable to parallel variation of a non-specific kind in both species, perhaps associated with latitude, altitude or homoclimatic contours, or a complex interaction of several such factors. It is hoped to investigate this question more thoroughly in the light of the large quantity of material now available.

13. *Myzus* (*Sciamyzus*) *cymbalariae* Stroyan, 1954.

A flourishing culture of this species was maintained for some weeks in the autumn of 1954 on potted plants of *Taraxacum officinale* at Cambridge. This is a new host record. From this culture a total of over 40 alatae was reared, which enables the writer to supplement the original description of this morph based upon only two specimens. In a fair number of the 1954 alatae the dorsal segmental bars on the abdomen showed a tendency to coalescence of the elements on the fourth and fifth or sometimes on the third to fifth tergites. This coalescence, while never really complete, causes the appearance of a rather broken mid-dorsal patch on these segments. Spinal tubercles occur with fair frequency on the seventh tergite, though rarely paired, and in one specimen a single spinal tubercle is present on both the seventh and sixth tergites. The observed range of secondary rhinarial numbers for a random sample of ten specimens from this material was : antennal joint III, 26–40 ; joint IV, 3–10 ; joint V, typically 0, 1 present in a single specimen. Mean values for these ten specimens together with the alata originally measured for the description were : joint III, 37, standard deviation 4 ; joint IV, 7, standard deviation 2.

15. *Ovatomyzus boraginacearum* Eastop, 1952.

According to Hille Ris Lambers (*in litt.*) this species is a synonym of *O. calaminthae* (Macchiati) and *O. pusillus* (Börner), the hosts of which include various species of Labiatae. Cross-transference of material from the Cambridge Botanic Garden to *Salvia* makes this certain. F. H. Jacob (*in litt.*) has also recorded *calaminthae* from *Scabiosa columbaria* on the Little Orme's Head, Caernarvon, a new county record, and it has been taken by Mr. J. P. Rogerson and the present author on *Teucrium scorodonia* at Carrawburgh, Northumberland (North).

30. *Pseudacaudella rubida* (Börner, 1939).

31. *Schizomyzus lindneri* Börner, 1950.

According to a personal communication to the writer from Dr. Hille Ris Lambers, the type material of *Pseudacaudella rubida*, which was described (Börner, 1939) from third and fourth instar larvae only, is identical with the species described as *Schizomyzus lindneri* by Börner in 1950. Since Börner in 1950, when validating his earlier *nomen nudum Pseudacaudella*, gave characters applicable to adult apterae, although in 1952 he repeats that only larval forms are known, it must be presumed that he had before him one or more larvae sufficiently near their final ecdysis to permit the appreciation of the adult caudal shape and absence of secondary rhinaria. It is unfortunate that the genus and species founded on immature forms must take priority over that

described from adults, since *Pseudacaudella* has page priority over *Schizomyzus*, and *rubida* antedates *lindneri* by 11 years. It is also unfortunate that the mosaic-like distribution of the original data, which rendered direct comparison of the two species in any one character impossible, should have led to the recording of both as British. The occurrence provides a valuable warning against the dangers of describing new forms without sufficient data.

33. *Aphis acetosae* L., 1767.

Following Buckton's usage the name *acetosae* was ascribed to Fabricius, 1775. According to Börner (1952) the name dates from Linnaeus (1767), and it should therefore be amended to read as above. Material collected from *Rumex acetosa* at Youlgreave, Derby, 4.vii.56 (*R. Gair, C. E. Taylor* and *H. L. G. S.* leg.) differs rather markedly from the aphids described from *Rumex acetosella* (Stroyan, 1955), and supports the idea that the latter constitute a separate species or subspecies. In the typical form from *R. acetosa* the antennal, frontal and outer tibial hairs are clearly longer than those of the *acetosella* aphids, the outer tibial hairs being as long as or longer than the inner ones along the whole length of the tibiae, and the longest hairs on ant. III being from three-quarters to ten-elevenths of the articular diameter of the joint in length. In addition to this, apterous viviparae from *R. acetosa* have the abdominal dorsum almost solidly black, with only a few intersegmental membranous spots, while aphids from *R. acetosella* have only separate segmental bars on the abdominal segments—a type of pattern which occurs in a single ovipara found among the material from *R. acetosa*. Alatae from *R. acetosa* have from 7 to 12 secondary rhinaria along the third antennal joint, and an abdominal pattern of segmental bars replaces the solid dorsal pigmentation of the apterae. The differences noted are of a type which is not always to be relied upon in the genus *Aphis* ; so for the present no action is felt to be justified to describe the *acetosella* form as new.

Measurements of specimens (*Rumex acetosa*) :

Apterous viviparous female : Body 1·97 mm., antennal flagellum 1·16 mm., joint ratios (III VI) 19 : 11 : 10 : 7 + 18, siphunculus 0·32 mm., cauda 0·20 mm., caudal hairs 16, apical rostral joint 0·136 mm., second joint of hind tarsus 0·118 mm., hairs on eighth tergite 8, longest hair on ant. III 21 μ, articular diameter of joint 28 μ.

Alate viviparous female : Body 2·09 mm., antennal flagellum 1·35 mm., joint ratios (III–VI) 21½ : 13 : 12 : 8 + 21, siphunculus 0·25 mm., cauda 0·17 mm., caudal hairs 18, apical rostral joint 0·126 mm., second joint of hind tarsus 0·124 mm., secondary rhinaria on ant. III 9 and 11, hairs on eighth tergite 12, longest hair on ant. III 23 μ, articular diameter of joint 25 μ.

Oviparous female : Body 1·93 mm., antennal flagellum 0·98 mm., joint ratios (III–VI) 14 : 9 : 9 : 6 + 17, siphunculus 0·24 mm., cauda 0·16 mm., caudal hairs 17, apical rostral joint 0·126 mm., second joint of hind tarsus 0·120 mm., hairs on eighth tergite 24, longest hair on ant. III 24 μ, articular diameter of joint 26 μ, pseudosensoria on hind tibiae 9 and 13 approximately (possibly an atypical specimen).

All specimens from Youlgreave, Derbys., 4.vii.56.

69. *Cinara laricicola* Börner, 1939.

Hille Ris Lambers (1956) has pointed out that this trivial name is preoccupied by *Lachnus laricicola* Matsumura, 1917, which is congeneric but specifically

distinct from Börner's species. He therefore has proposed the new name *Cinara börneri* for *C. laricicola* Börner, 1939, non (Matsumura, 1917).

70. *Cinara montanicola* (Börner, 1939).

The material from Cambridge identified by the late Dr. Pašek as *C. montanicola* is now known to be referable to *Cinara acutirostris* Hille Ris Lambers, 1956, and this addition to the British fauna should now be listed under this name. The true *montanicola* Börner is regarded by Hille Ris Lambers (1956) as a synonym of *pini* L., *sensu* H. R. L. (= *nuda* Mordv., *sensu* Börner, 1952). The diagnostic characters of *acutirostris* are the length breadth ratio of the articulated distal part of the apical rostral joint (3·5 as against 2·5 in *pini* L., H. R. L.), and the length ratio of the apical rostral joint (both parts) to the two hind tarsal joints taken together (longer in *acutirostris*, shorter in *pini*). The third member of this species group acknowledged by Hille Ris Lambers (1956), *Cinara escherichi* (Börner, 1950), is not yet recorded from Britain.

Since Börner (1939) described *Cinaria montanicola* as a new genus and new species the reference in my previous paper should have given the author's name in brackets.

72. *Mimeuria ulmiphila* (Del Guercio, 1917).

Further records of this species in Britain are now available. Apterae and immature forms have been found on elm roots in Herts. (Harpenden and Wheathampstead, common), Northants. (East Haddon) and Hereford (near Leominster). In the last-named locality the elms adjoined a garden in which raspberries were grown, and some cysts were found on the roots of the raspberries adjacent to the elm hedge (Vernon, 1957). This is the first evidence showing that the aphid-fungus symbiosis of this species is not necessarily exclusive to the roots of elm, and some interest attaches to what was probably only a casual occurrence on that account. I am told by Mr. J. P. Doncaster that the Walker collection in the National Museum of Ireland contains one excellently preserved alata of *M. ulmiphila* from Southgate, Middlesex, 17.x.1847, which must certainly be the earliest British record. No host plant is given, so presumably the specimen was a vagrant.

Appendix (B).

Myzus (*Nectarosiphon*) *certus* (Walker, 1849).

During 1955 specimens of a *Nectarosiphon* species were trapped in Westmorland and Midlothian which differed from the normal alatae of this group in possessing secondary rhinaria on the fourth antennal joint. The observed range in 31 specimens from both areas was 0 to 6, with the modal class at 2 rhinaria on IV. This character is similar to that described by Hille Ris Lambers (1952) for *Myzus* (*Nectarosiphon*) *polaris* sp. n. from Greenland and Iceland. Theobald (1926) figures an antenna with a single rhinarium on IV for his var. *cerastii* of *M. persicae* (Sulz.). When the specimens were submitted to Dr. Hille Ris Lambers he expressed the opinion that they were not *polaris* but a form of *M.* (*N.*) *certus* (Wlk.). Investigation in the locality in

Midlothian showed that abundant *Cerastium*, both *C. tetrandrum* and the cultivated *C. tomentosum*, was present in the surroundings of the trap from which the alatae were recorded. However, thrashing only produced a single aptera of *certus* from the *C. tetrandrum* and none from the *C. tomentosum*, so that the origin of the alatae remained uncertain. However, it does appear that in the north of Britain the characters of *M. certus* approach those of *M. polaris*, which perhaps represents the terminal portion of a south-east to north-west cline, originally continuous but now broken up by isolation of the Greenland and Iceland populations on the arctic-alpine *Cerastium alpinum*. It is interesting to observe that a parallel phenomenon seems to occur in *Nasonovia nigra* (H. R. L.) and *N. compositellae* (Theob.), where rhinaria on joint IV are characteristic of the northern and western *compositellae*, *nigra* having rhinaria only on III in the apterae.

Forda skorkini Mordvilko, 1935.

This species has been recorded as British by Theobald (1929) under the name of *Pentaphis marginata* Koch. His drawing of the antennal chaetotaxy is adequate for identification, the salient characters being the small round primary rhinarium, which is unfringed, on the fifth joint, and the rather numerous fairly long hairs. *F. skorkini* was described from barley near Odessa. Theobald records his *P. marginata* from wheat and barley.

Baizongia pistaciae (L., 1767).

This species has also been recorded from Britain by Theobald (1929) as *Tycheoides setariae* Pass. Here also his figures are sufficient for diagnosis of the species; the sparse long hairs on the antennal joints, the fringed primary rhinaria, the relative lengths of the antennal joints and the long segmental hairs on the margins of the posterior abdominal segments form a combination which is quite unambiguous. The capture recorded from Porlock, Somerset, however, is a *Geoica*.

V. Acknowledgments.

The help given by many colleagues and friends in the preparation of this list is very gratefully acknowledged. Particularly to be thanked are Dr. Hille Ris Lambers for much helpful information and discussion at all stages, and especially for indicating the synonymies of several species of *Chaitophorus*, *Pseudacaudella rubida*, *Baizongia pistaciae* and *Forda skorkini*; Dr. V. F. Eastop for many records of new or rare British species, and Dr. B. M. Hobby for putting at the writer's disposal an advance proof of one of Dr. Eastop's papers during the latter's absence abroad; Mr. C. T. Gimingham for assistance in tracing the locality for *Neokakimia dasyphylli*; Mr. F. H. Jacob for the loan of material of *Lipaphis*, and for allowing the description here of *Brachycaudus jacobi*; Dr. A. R. Hill for help in obtaining Scottish material of *Kallistaphis betulicola*; Mr. M. W. Shaw for material of *Acyrthosiphon shawi* and for permission to describe it; and Mr. J. P. Doncaster for repeated help in tracing old records of aphids from the collections of the British Museum (Natural History), and for material of *Pemphigus populi* Courchet. Others who have

greatly assisted by devoting time and transport to the collection of aphids in their areas are Dr. J. H. Fidler and Messrs. A. F. G. Dixon, A. G. Fisken, R. Gair, H. G. Morgan and J. P. Rogerson, and I am most grateful to them for their help and hospitality.

VI. Summary.

This paper records 41 additions to the British aphid fauna, of which three are described as new to science, two are given new names owing to previous misidentifications and one is recorded as a *nomen nudum* in advance of publication by agreement with the writer's co-author, Dr. Hille Ris Lambers. In the appendix certain notes on synonymy are given together with additional data for certain species listed in *Recent Additions*.

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PLATE I.

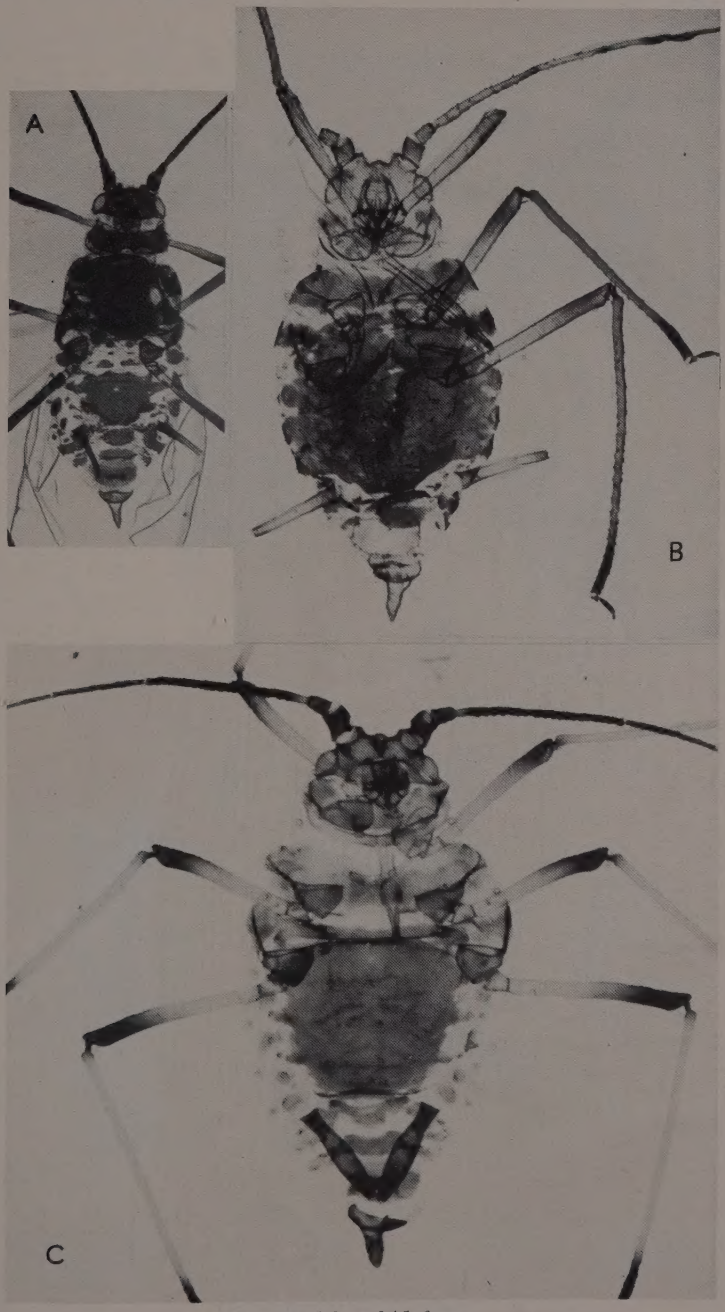
A. *Nasonovia* (*Neokakimia*) *dasyphylli* sp. n., al. viv. ♀.
B. Ditto, apt. viv. ♀.
C. *Hyperomyzus* (*Necnasonovia*) *hieracii* (Börner), apt. viv. ♀.

PLATE II.

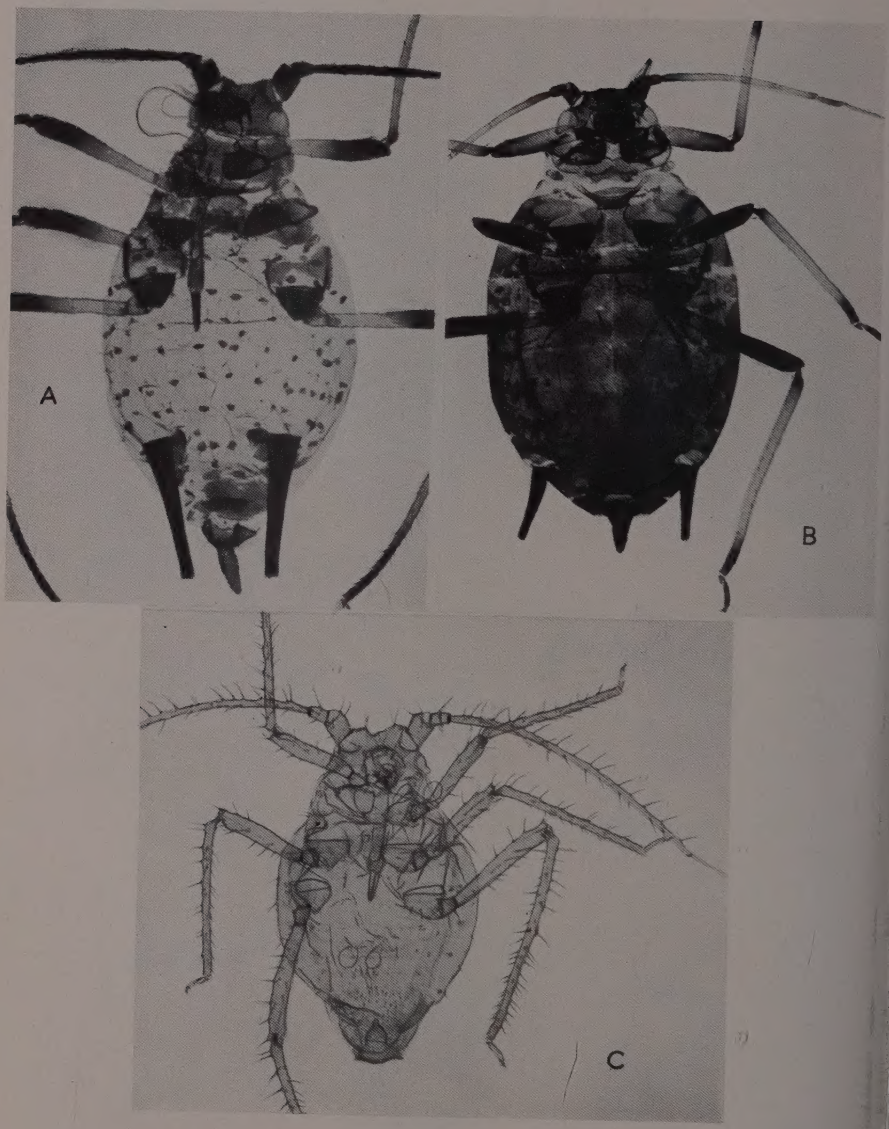
A. *Dactynotus* (*Uromelan*) *helenae* H. R. L., apt. viv. ♀.
B. *Aphis comosa* (Börner), apt. viv. ♀.
C. *Decorosiphon corynothrix* Börner, apt. viv. ♀.

PLATE III.

A. *Acyrthosiphon shawi* sp. n., apt. viv. ♀.
B. *Brachycaudus jacobi* sp. n., al. viv. ♀.



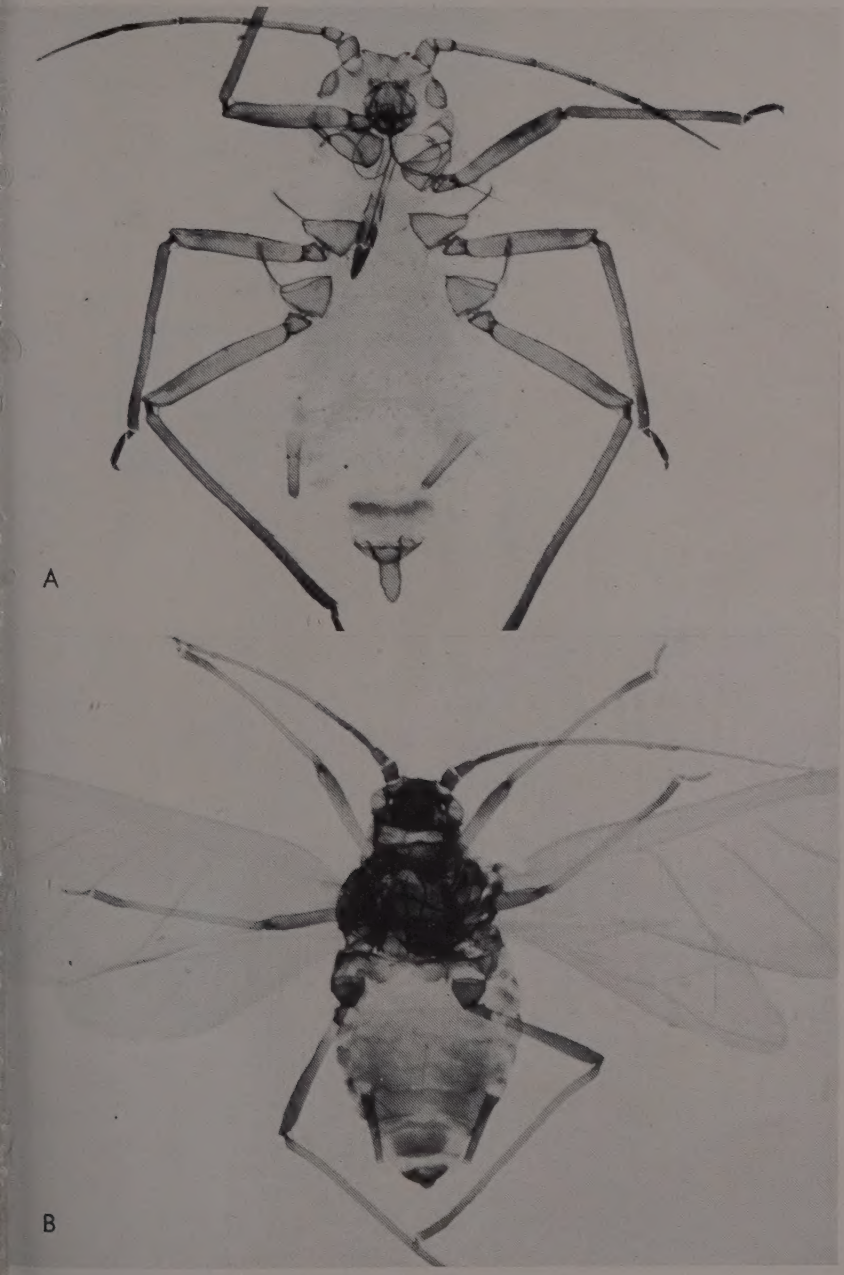
The British aphid fauna.



The British aphid fauna.

H. L. G. Stroyan.

Adlard & Son, Ltd., Dorking.



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